

JVC

SERVICE MANUAL

COLOUR TELEVISION

BASIC CHASSIS
CL

■ DIFFERENCE LIST

●USING PW BOARD

PWB A'SSY	Model	AV-K21T(SF)	AV-K21T(SF/C)	Remark
	MAIN PWB	SCL-1066A-CK	SCL-1081A-CK	Not interchangeable

●EXPLODED VIEW PARTS LIST

△	Ref. No.	Parts No.		Parts Name	Remarks
		AV-K21T(SF)	AV-K21T(SF/C)		
△	V01	A51LEC095X41	A51LMV10X10528	PICTURE TUBE	Not interchangeable
△		CM30964-004-S	CM30964-005	SPACER	↑
△		CM23113-007	CM23113-015	RATING LABEL	↑

●PACKING PARTS LIST

			CP30902-057(R)	POSS LABEL	Addition
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●PRINTED WIRING BOARD PARTS LIST

△	Symbol No.	Parts No.		Parts Name	Remarks
		SCL-1066A-CK (AV-K21T(SF))	SCL-1081A-CK (AV-K21T(SF/B))		
	C1213	QEN61CM-106Z	QEPF1CM-106Z	BP E CAP	10 μ F 16V M
△	C1524	QFZ0117-1102	QFZ0198-113	MPP CAP	0.011 μ F 1.5kVH \pm 3%
△	C1527	QFZ0151-434	QFZ0197-434	MPP CAP	0.43 μ F 250V J
	T1101	CELT001-303	CELT001-303J3	CW TRANSF.	
	L1551	QQLZ018-540	QQLZ018-430	HEATER CHOKE	
	IC1751	PIC-37243SR	PIC-47143SY	IR DETECT	
	IC1941	S1854-C2	S1854A	IC	
	J1001	CEMN075-001	QNN0384-001	PIN JACK	
	PC1921	TLP721F(GR)	TLP721F(D4-GR)	PHOTO COUP	
	S1751-55	QSP1A11-C18Z	QSW0618-003Z	PUSH SWITCH	
	TH1901	CEKP010-001J2	QAD0101-9R0	W-PTC	

JVC

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SAFETY INSTRUCTIONS

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" DESCRIBED BELOW.

X-RAY RADIATION PRECAUTION

1. Excessive high voltage can produce potentially hazardous X-RAY RADIATION. To avoid such hazards, the high voltage must not be above the specified limit. The nominal value of the high voltage of this receiver is 28.0kV*1 at zero beam current (minimum brightness) under 110 ~ 240V AC power source. The high voltage must not, under any circumstances, exceed 29.0kV*2. Each time a receiver requires servicing, the high voltage should be checked following the HIGH VOLTAGE CHECK procedure in this manual. It is recommended the reading of the high voltage be recorded as a part of the service record. It is important to use an accurate and reliable high voltage meter.
2. The only source of X-RAY RADIATION in this TV receiver is the picture tube. For continued X-RAY RADIATION protection, the replacement tube must be exactly the same type tube as specified in the parts list.
3. Some parts in this receiver have special safety-related characteristics for X-RAY RADIATION protection. For continued safety, parts replacement should be undertaken only after referring to the PRODUCT SAFETY NOTICE below.

*1	1450XM/2050XM	24.0kV
*2	1450XM/2050XM	26.0kV
*3	1450XM/2050XM	22.5kV

SAFETY PRECAUTION

1. Potentials as high as 26.5kV*3 are present when this receiver is operating. Operation of the receiver outside the cabinet or with back board removed involves a shock hazard from the receiver.
 1. Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high-voltage equipment.
 2. Always discharge the picture tube anode to the receiver chassis to keep off the shock hazard before removing the anode cap.
 3. Perfectly discharge the high potential of the picture tube before handling the tube. The picture tube is highly evacuated and if broken, glass fragments will be violently expelled.
2. If any Fuse in this TV receiver is blown, replace it with the Fuse specified in the chassis parts list.
3. When replacing parts or circuit boards, wind the lead wires around terminals before soldering.
4. When replacing a high wattage resistor (oxide metal film resistor) in circuit board, keep the resistor 10mm away from circuit board.
5. Keep wires away from high voltage or high temperature components.
6. This receiver can be operated under AC 110 ~ 240 volts, 50/60Hz. NEVER connect to DC supply or any other power.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-RAY RADIATION protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual and its supplements, electrical components having such features are identified by the international hazard symbols on the schematic diagram and the parts list.

Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create X-RAY RADIATION.

INTRODUCTION

Features

AV terminals for external equipment connection

- Video/audio inputs.
- Television output terminals.

Enjoying TV games

Two games, SLOT, DICE, are programmed in this TV.

Off-timer

Turns off the TV automatically at a preset time.

Auto-Power-Off

If a vacant channel is tuned or TV broadcast for a day is finished, the TV will automatically turn off after about 15 minutes. However, if the Off-timer is operating, it takes precedence. This Auto-Power-Off feature does not operate in the VIDEO or blue background OFF mode.

No-Signal-Mute

When the system receives a TV signal from the aerial input (T) which does not contain a video signal, the sound will be muted. This No-Signal-Mute does not operate in the blue background OFF mode.

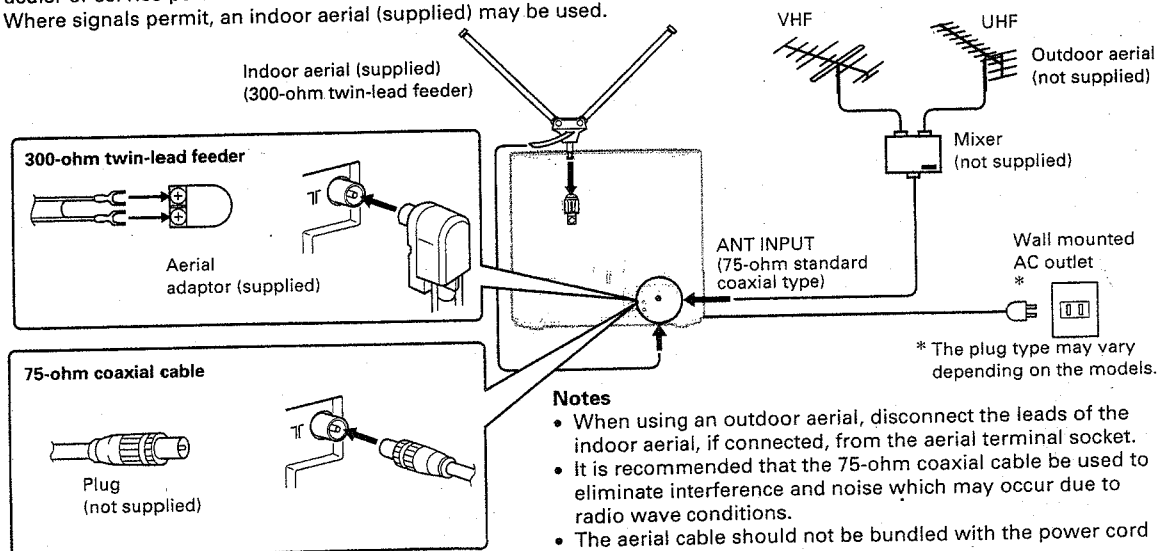
INTRODUCTION

Installation

- INSTALL the unit in a room where direct light will not fall upon the screen. Tonal darkness or a reflection on the picture screen may cause eyestrain. Soft and indirect lighting is recommended for comfortable viewing.
- ALLOW enough space between the unit and the wall for proper ventilation.
- AVOID excessively warm locations to prevent possible damage to the cabinet or components.

To connect the aerial

Optimum reception of colour requires a good signal and will generally mean that an outdoor aerial must be used. The exact type and positioning of the aerial will depend upon your particular area. Your Toshiba dealer or service personnel can best advise you on which aerial to use in your area. Where signals permit, an indoor aerial (supplied) may be used.

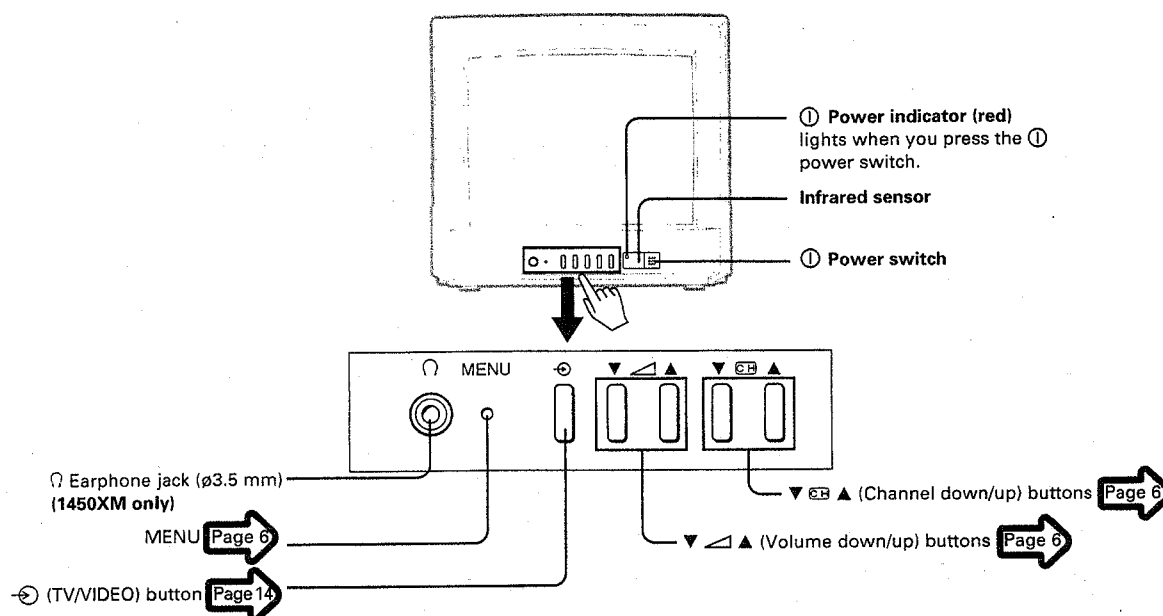


INTRODUCTION

Names and Functions of Controls

- The following describes the name of each part of the TV and Remote Controller.

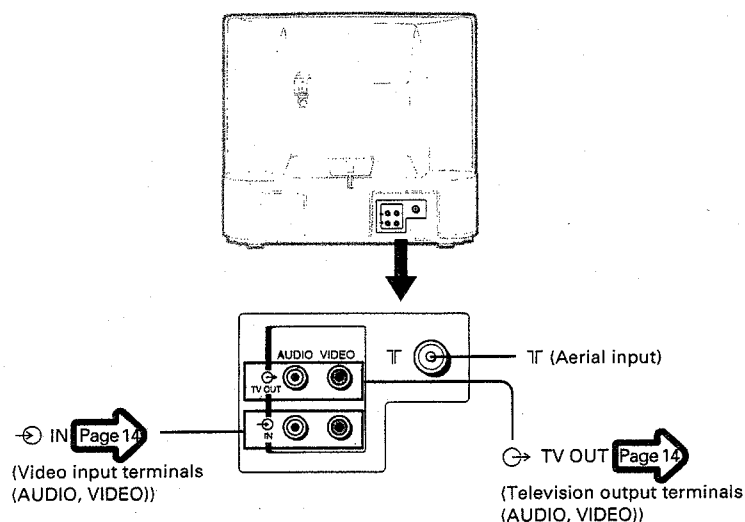
Front



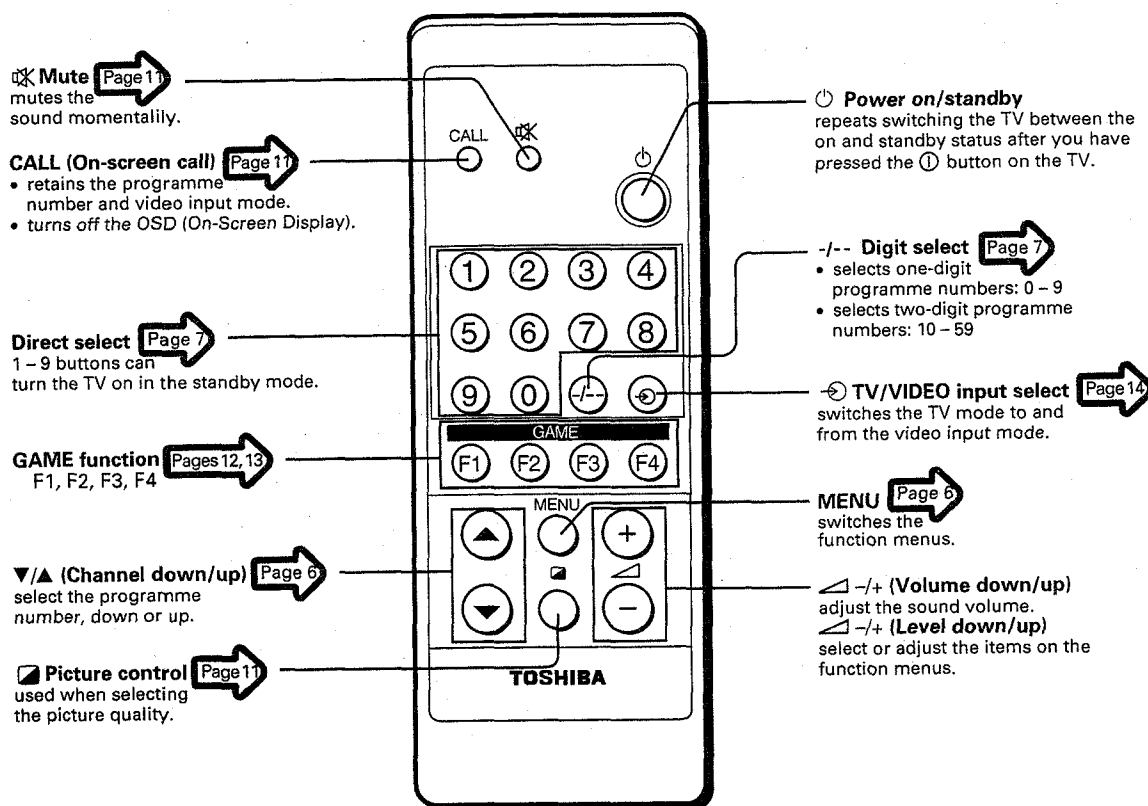
Notes

- To push the MENU button, insert a tool with a fine point into the hole.
- Functions of MENU, (TV/VIDEO), Channel down/up, and Volume down/up are also provided to the Remote Controller.
- When the Remote Controller is not at your hand, you can turn on the set by pressing the Channel down/up or Volume down/up button on the TV set.

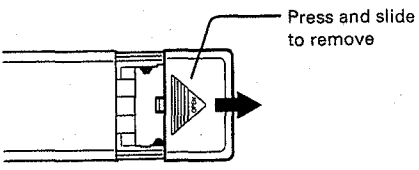
Back



Remote Controller

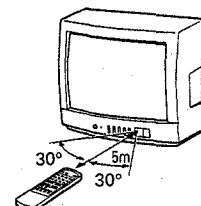


Battery installation

- 1 Place the Remote Controller face down and remove the battery cover.
- 
- Press and slide to remove
- 2 Insert two "AAA" size batteries matching the + and – signs on each battery with the + and – signs of the battery compartment.
 - 3 Slide the battery cover shut until the lock snaps.

Tips for remote operation

Effective range

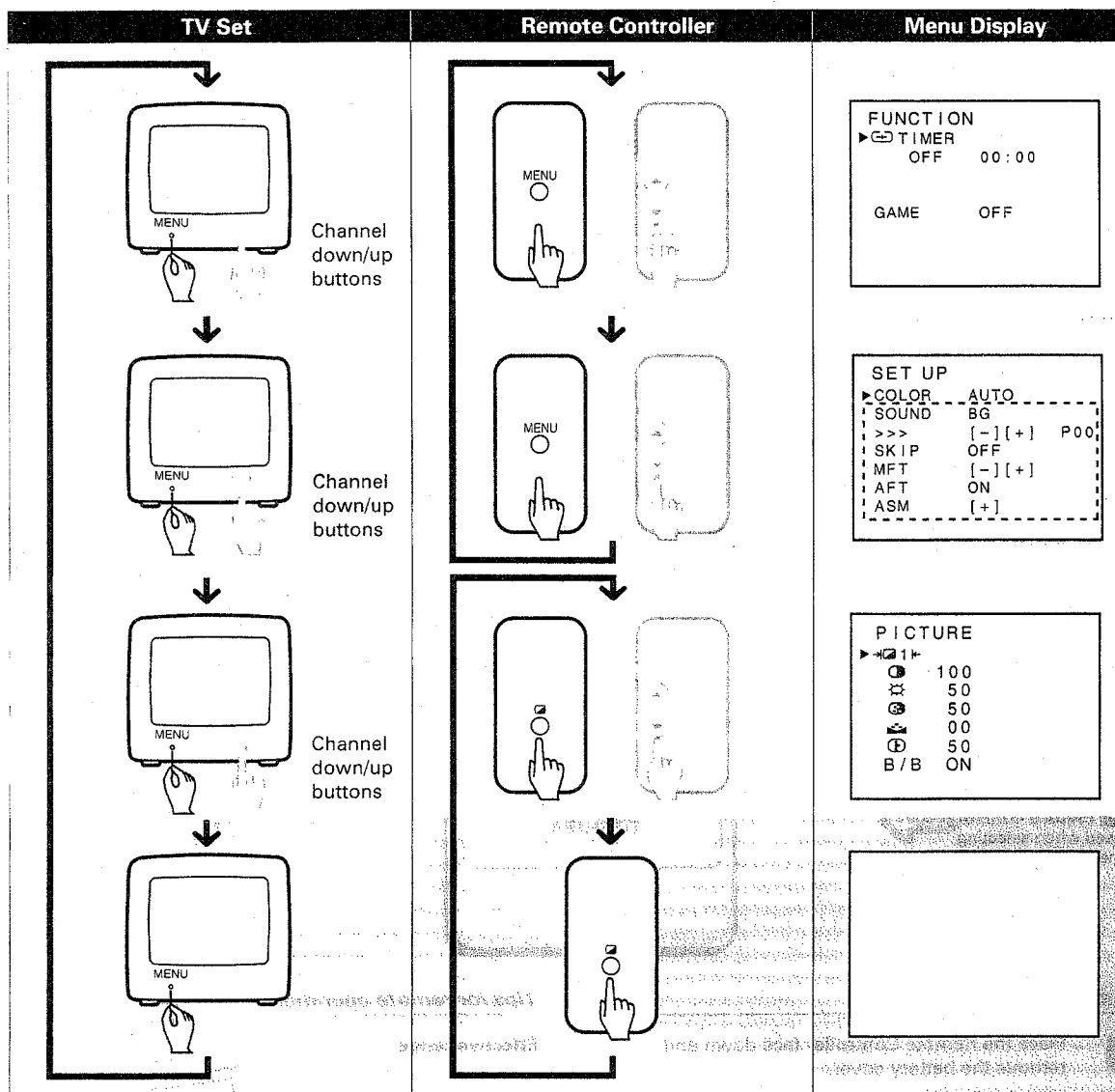


- The battery life should be about one year under normal use.
- When the Remote Controller will not be used for a long period of time or when the batteries are worn out, remove the batteries to prevent leakage.
- Do not throw the batteries into a fire. Dispose of used batteries in the specified manner.
- Do not drop, dampen or disassemble the Remote Controller.


GETTING STARTED

Menu Function

- Before watching the TV, please familiarize yourself the method to use the menu function of this TV set.
- The owner's manual shows the explanation for operations mainly using the Remote Controller. But you can perform the operations using the buttons on the TV set as well.



Notes

- The halftone illustrations above indicate that you press the button(s) to select the items on each function menu. After that, use the volume down/up buttons to adjust (or select) further items.
- The  area on the SET UP menu display does not appear in the video mode.

GETTING STARTED

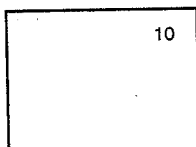
Tuning in

- First, use the ASM (Automatic Search Memory) function to preset all active channels in your area automatically. Then, arrange the preset channels with the SEARCH (>>>), SKIP, MFT (Manual Fine Tuning) and AFT (Auto Fine Tuning) functions so that you can tune into only desired channels.

To watch a TV programme

To select a TV programme

Select the desired programme.



Using the direct select buttons

- To select a one-digit programme number: press the \swarrow button to display "--" and 0-9 to select a number. (0-9)
- To select a two-digit programme number: press \swarrow to display "--" and press 0-9 to select a number. (10-59)

Using the channel down (▼)/up (▲) buttons

Press ▼ to select lower programme numbers; ▲ to select higher ones.

If the colour or sound of a certain channel is abnormal

The colour or sound system setting may be incorrect. Press the MENU button to call up the SET UP menu on the right and change the setting as follows: For the systems in each country, refer to the table in the right column.

SET UP	
► COLOR	AUTO
SOUND	BG
>>>	[-] [+] P00
SKIP	OFF
MFT	[-] [+]
AFT	ON
ASM	[+]

- When the colour of the picture is abnormal**
Press the ▼/▲ buttons to move the cursor (►) to COLOR and select the correct colour system with the \swarrow / \searrow buttons. AUTO, PAL, SECAM, 443NTSC and 358NTSC will appear cyclically.
- When the sound is abnormal**
Press the ▼/▲ buttons to move the cursor (►) to SOUND and select the correct sound system with the \swarrow / \searrow buttons. BG, I, DK and M will appear cyclically.

If the sound or picture of every channel is abnormal

Preset the channels using the ASM (Automatic Search Memory). See page 8.

Broadcast Transmission Systems in Each Country

Area	Country	System	
		Colour	Sound
Asia M. E.	Bahrain, Kuwait, Israel, Oman, Qatar, United Arab Emirates, Yemen, etc. Indonesia, Malaysia, Singapore, Thailand, etc.	PAL	B/G
	China, etc.	PAL	D/K
	Hong Kong	PAL	I
	Iraq, Iran, Lebanon, Saudi Arabia, etc.	SECAM	B/G
	Russian Federation, etc.	SECAM	D/K
	Myanmar, etc.	NTSC	M
Oceania	Australia, New Zealand, etc.	PAL	B/G
Africa	Republic of South Africa, etc.	PAL	I
South America	Argentina, Paraguay, Uruguay, etc.	PAL	N
	Brazil	PAL	M
	Chile, Colombia, etc.	NTSC	M

Note

"B/G" and "D/K" will be displayed as "BG" and "DK" on the screen. PAL, SECAM and 358NTSC are different colour signal broadcast transmission systems applicable to different countries. 443NTSC is used in special VTRs to playback NTSC recorded video tapes through PAL television equipment.
[358NTSC = NTSC 3.58 MHz, 443NTSC = NTSC 4.43 MHz]

GETTING STARTED

Tuning in (continued)

- Use the SEARCH function if desired channels cannot be preset with the ASM or if you would like to preset the desired channels to specific programme numbers one by one.

To preset channels (ASM)

ASM (Automatic Search Memory)

- Select the head of the programme number to start the ASM with the channel down (▼)/up (▲) buttons or direct select buttons.

1
- Press the MENU button repeatedly to call up the SET UP menu on the screen.

SET UP
 ► COLOR AUTO
 SOUND BG
 >>> [-][+] P01
 SKIP OFF
 MFT [-][+]
 AFT ON
 ASM [+]
- Confirm that "COLOR" is set to "AUTO" and "SOUND" is set to proper system. If not, press the ▼/▲ buttons to move the cursor (►) to "COLOR" or "SOUND" and press the ◀-/+ buttons to select each proper system.

SET UP
 COLOR AUTO
 SOUND BG
 >>> [-][+] P01
 SKIP OFF
 MFT [-][+]
 AFT ON
 ► ASM [+]
- Press the ▼/▲ buttons to move the cursor (►) to "ASM".

SET UP
 COLOR AUTO
 SOUND BG
 >>> [-][+] P01
 SKIP OFF
 MFT [-][+]
 AFT ON
 ► ASM [+]
- Press the ◀ "+" button to start the ASM. All active channels will be preset automatically. When presetting is complete, the initial programme number will reappear.

1
 V >>>

After presetting

Check the preset channels by pressing the channel down (▼)/up (▲) buttons.

- If the picture or sound of a certain channel is not good, fine-tune the channel using the MFT function. See page 9.
- If the colour of a certain channel is abnormal, automatic colour system selection (AUTO) may malfunction or sound system selection is wrong. In such a case, select another colour and/or sound system.

To preset channels (Manual search)

Manual search (>>>)

- Select a programme number with the channel down (▼)/up (▲) or direct select buttons.

3
- Press the MENU button repeatedly to call up the SET UP menu on the screen.

SET UP
 ► COLOR AUTO
 SOUND BG
 >>> [-][+] P03
 SKIP OFF
 MFT [-][+]
 AFT ON
 ASM [+]
- Press the ▼/▲ buttons to move the cursor (►) to ">>>".

SET UP
 COLOR AUTO
 SOUND BG
 >>> [-][+] P03
 SKIP OFF
 MFT [-][+]
 AFT ON
 ASM [+]
- Press the ◀-/+ buttons to start searching. The ◀- button searches for lower-numbered channels; the ◀+ button for higher-numbered channels. Repeat this process until you can get the desired channel.

Ex. search up
 U >>>

Ex. search down
 U <<<
- When the desired programme is shown, press the ⏻ (TV/VIDEO) button to move the cursor (►) to "P03". Then, press the ◀-/+ buttons to set the programme number.

SET UP
 COLOR AUTO
 SOUND BG
 >>> [-][+] ► P03
 SKIP OFF
 MFT [-][+]
 AFT ON
 ASM [+]

When you	◀-/+	Programme number
press once	+	increased by 1
	-	decreased by 1
hold down	+	increased by 10
	-	decreased by 10

- When you press the ⏻ (TV/VIDEO) button again, the channel is memorized at the current programme number.

SET UP
 COLOR AUTO
 SOUND BG
 >>> [-][+] P14
 SKIP OFF
 MFT [-][+]
 AFT ON
 ASM [+]

- Repeat steps 3 through 6 to preset other channels.

- The AFT (Auto Fine Tuning) function automatically corrects slight fluctuations when receiving signals.
 - The MFT (Manual Fine Tuning) and AFT adjustments are not necessary under normal conditions. However, in areas of inferior broadcast conditions where adjustment is necessary for a better picture, adjust the tuning with the MFT. The AFT OFF status automatically keeps the condition adjusted with the MFT function.
- * Receiving frequencies may change due to aging.

MFT and AFT

MFT (Manual Fine Tuning)

- 1 Select the programme number you want to fine-tune with the channel down (▼)/up (▲) buttons or direct select buttons.
- 2 Press the MENU button repeatedly to call up the SET UP menu on the screen.
- 3 Press the ▼/▲ buttons to move the cursor (►) to "MFT".
- 4 Press the ◀-/➡ buttons until the best possible picture and sound are obtained.

Note

When operating the MFT function, the AFT status is automatically set to OFF.

AFT (Auto Fine Tuning)

- 1 Press the MENU button repeatedly to call up the SET UP menu on the screen.
- 2 Press the ▼/▲ buttons to move the cursor (►) to "AFT".
- 3 Press the ◀-/➡. The displays "OFF" and "ON" appear alternately. Select the "ON" indication.

Note

When the channel is set to AFT OFF status, the "-" mark appears to the left of the programme number. When the channel is set to AFT ON status, the programme number is displayed without the "-" mark.

To skip unnecessary programme numbers

To skip a programme number

After presetting the channels, you may skip unnecessary programme numbers so that only the channels you want to watch are selected.

- 1 Select the programme number to be skipped with the channel down (▼)/up (▲) buttons or direct select buttons.
- 2 Press the MENU button repeatedly to call up the SET UP menu on the screen.
- 3 Press the ▼/▲ buttons to move the cursor (►) to "SKIP".
- 4 Press the ◀-/➡ buttons to select "SKIP ON".
- 5 Press the MENU button to turn off the SET UP menu display. Select the programme number to be skipped with the direct select buttons. The * mark appears to the left of the programme number. The programme number will then be skipped when you select the programme with the channel down (▼)/up (▲) buttons.

To restore a skipped programme number

- 1 Select the programme number you want to restore with the direct select (and/or digit select) buttons.
- 2 Press the MENU button to call up the SET UP menu display and press the ▼/▲ buttons to move the cursor (►) to "SKIP".
- 3 Press the ◀-/➡ buttons to select "SKIP OFF".

ADVANCED OPERATION

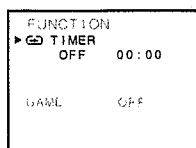
OFF Timer and Blue Background Functions

- With the OFF timer, the TV will automatically switch to standby mode at a preset time.
- With the blue background function ON, the TV will automatically turn blue when no signal is being received.

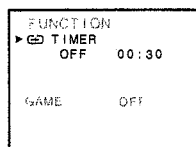
OFF timer

To turn off the TV automatically (OFF timer)

- 1** Press the MENU button repeatedly to call up the FUNCTION menu on the screen. Then, press the ▼/▲ buttons to move the cursor (►) to "TIMER".



- 2** Press the ◀-/➤ buttons to set the hours and minutes you want.



Note

The maximum presettable time for the OFF timer is 12:59.

When you	◀-/➤	Setting time is
press once	⊕	increased by 1 minute
	⊖	decreased by 1 minute
hold down	⊕	increased by 30 minutes
	⊖	decreased by 30 minutes

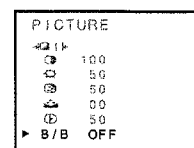
To cancel the OFF timer

Press the ⏻ button twice (to turn off the TV once and turn it on again) or in step 2 above set the OFF time to 00:00.

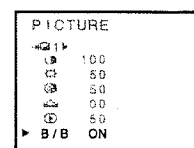
Blue background

To turn the screen blue

- 1** Press the button and press the ▼/▲ buttons to move the cursor (►) to "B/B".



- 2** Press the ◀-/➤ buttons to select "ON".



To turn off the blue background

Repeat steps 1 and 2 above and select B/B OFF.








ADVANCED OPERATION

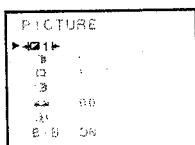
Convenient Picture and Sound Controls





- You can select the picture quality instantly from among three preset modes and one user-set mode.

Selectable picture


To select the picture mode

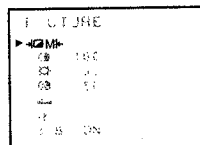
Press the  button to call up the PICTURE quality selection menu on the screen. Then, press the   buttons to select the desired picture quality.    and  (user-set) can be selected cyclically.





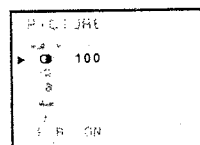
Mode	Picture quality
	bright and dynamic picture
	standard picture
	soft and moody picture
	the picture quality you set



To set the desired picture quality to the MEMORY position

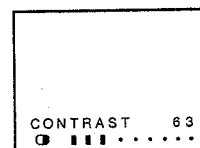
- Press the  button.











- Press the   buttons to move the cursor (▶) to the desired item.










- Press the   to adjust the level. The adjusted level is stored in the MEMORY position.



Note

Only the tint () adjusted level is common to all the four modes,    and . The fixed and characteristic tint levels are not given for the   and  modes.

Item		Pressing	
			
	CONTRAST	weaker	stronger
	BRIGHTNESS	darker	lighter
	COLOUR	paler	deeper
	TINT *	purplish	greenish
	SHARPNESS	softer	sharper


* for NTSC only

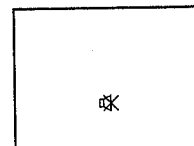
Sound muting


To mute the sound

The muting function is convenient when you need to pay attention to surrounding sounds, answer a phone call, receive a visitor, etc.



- Press the  button.



- To restore the sound, press the  button again.

On-screen calling

To retain the on-screen display

Generally, the programme number will disappear within 5 seconds once the programme number has been changed.

- To retain the programme number on the screen, press the CALL button.
- To return to the automatic-disappearing mode, press the CALL button again.

To turn off the menu function display instantly

Generally, the menu function display (FUNCTION, LANGUAGE, SET UP, PICTURE) is retained by pressing the MENU button once.

To turn off the display instantly, press the CALL button.

ADVANCED OPERATION

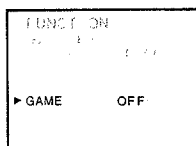
Enjoying TV Games

- You can enjoy two games, SLOT, DICE, programmed in this TV.

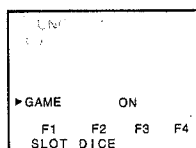
To play TV games

To select the TV game mode

- Press the MENU button repeatedly to call up the FUNCTION menu on the screen. Then, press the ∇/Δ buttons to move the cursor (\blacktriangleright) to "GAME".



- Press the Δ/∇ buttons to select "ON". The names for the two games appear at the bottom of the screen.



Note

The sound mode set in the normal TV mode remains the same in the game mode.

To cancel the TV game mode

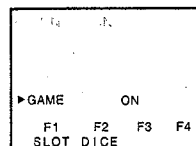
Press the Δ/∇ buttons again to highlight "OFF". The TV resets to the TV mode.

To play "SLOT"

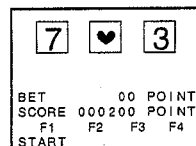
This is a slot machine game.



- Select the TV game mode.



- Press the F1 button to select "SLOT". The display on the right appears. Numbers 1 through 8 and the pictogram \heartsuit appear randomly in each window, one by one.

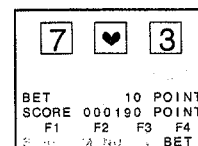


Item explanation:

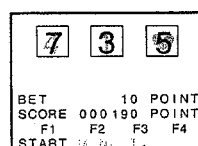
BET	Points to bet. Press the F4 button once to add 1 POINT to the BET POINTS. A BET must be placed before playing the game. As many as 10 POINTS can be bet at a time.
SCORE	Your current SCORE. You start out with 200 POINTS. Points are won or lost, depending upon how much is bet.

- Press the F4 button to set the BET POINTS.

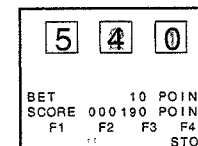
Ex. BET 10 POINTS



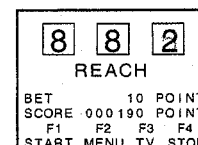
- Press the F1 button to start the game. Each window turns to quick and random change mode simultaneously. The "BET" display on the right bottom of the screen changes to "STOP".



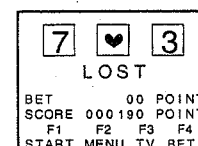
- The windows change from left to right, one by one, each time you press the F4 button. Messages appear, depending on the window combinations:



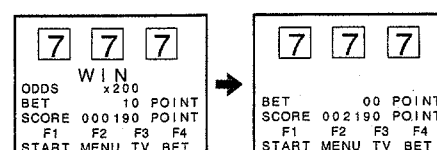
When the first two windows are the same "REACH" appears in the centre of the screen.



When no windows are the same "LOST" appears in the centre of the screen, and the current bet is lost. "STOP" changes to "BET", and the game returns to the BET mode.



When two or all the three windows are the same "WIN" and "ODDS \times ___" are displayed for a moment, and your BET is multiplied by "___". This total is added to your SCORE. The BET setting is then reset to 0. "STOP" changes to "BET", and the game returns to the BET mode.



To play TV games (continued)

- 6** After pressing the **F4** button three times, all three windows stop changing. Repeat steps 3 through 5 to play again. Good luck!

- 7** When your SCORE is 0, the game ends. "GAME OVER" appears. (Hard luck!)

7	♥	3
LOST		
GAME OVER		
BET	00	POINT
SCORE	000000	POINT
F1	F2	F3 F4
START	MENU	TV BET

To play again

Press the **F2** button, and go back to step 1.

To play other games

Press the **F2** button to display the GAME menu.

To return to the TV mode

Press the **F3** button.

Note

The odds and payback vary according to the window combination.

Combination	Odds
7 7 *	× 5
7 * 7	× 5
* 7 7	× 5
♥♥*	× 10
♥*♥	× 10
*♥♥	× 10
♥♥♥	× 300
1 1 1	× 100
2 2 2	× 100
3 3 3	× 100
4 4 4	× 100
5 5 5	× 100
6 6 6	× 100
8 8 8	× 100
7 7 7	× 200

To play "DICE"

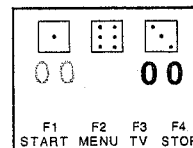
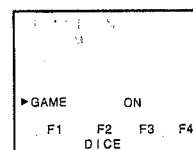
This is a dice game in which two players compete by casting three dice and totaling the score.



- 1** Select the TV game mode, and press the **F2** button to select "DICE".

The display on the right appears.

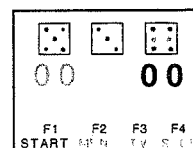
The right "0" and the left "0" are the scores for player 1 and player 2, respectively.



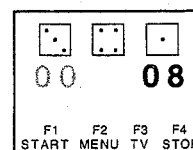
- 2** Press the **F1** button to start the game. The three dice start spinning randomly for player 1.

Note

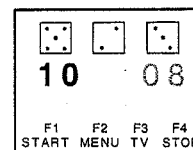
The initial spots on the dice are random.



- 3** Press the **F4** button repeatedly to stop the dice one at a time, from left to right. When all the dice are stopped, the total of the dice is added to the score for player 1.



- 4** Switch to player 2, and repeat steps 2 and 3. The dice total is added to the score for player 2.



- 5** Repeat steps 2 through 4 to play again.

To play other games

Press the **F2** button to display the GAME menu.

To return to the TV mode

Press the **F3** button.



External Equipment Connections


- ## To connect video equipment

- The output terminals of the TV set (G→ TV OUT) output the video and audio signals being aired through the aerial input.
You can record a TV programme by connecting a VTR from the output terminals (G→ TV OUT) to the input terminals of the VTR.
- You can playback the tape by connecting another VTR (or video camera, etc.) from the output terminals of the VTR to the input terminals (⊖ IN).

Note
If you use only one VTR for recording and playback, unusual phenomena may happen to the TV set and/or VTR.

To select the video input



Press the  TV/VIDEO button.
The "" mark and programme number appear alternately.

Input indicator	Input terminal to be selected
	video input
Programme number	aerial input

The colour system setting may be incorrect.

- 1** Press the MENU button repeatedly until you see the display on the right.

SET UP
▶ COLOR AUTO

- 2** Press the  \pm (or ) buttons to select the correct colour system. "AUTO", "PAL", "SECAM", "443NTSC" and "358NTSC" appear cyclically.

SET UP
▶ COLOR PAL

OTHER

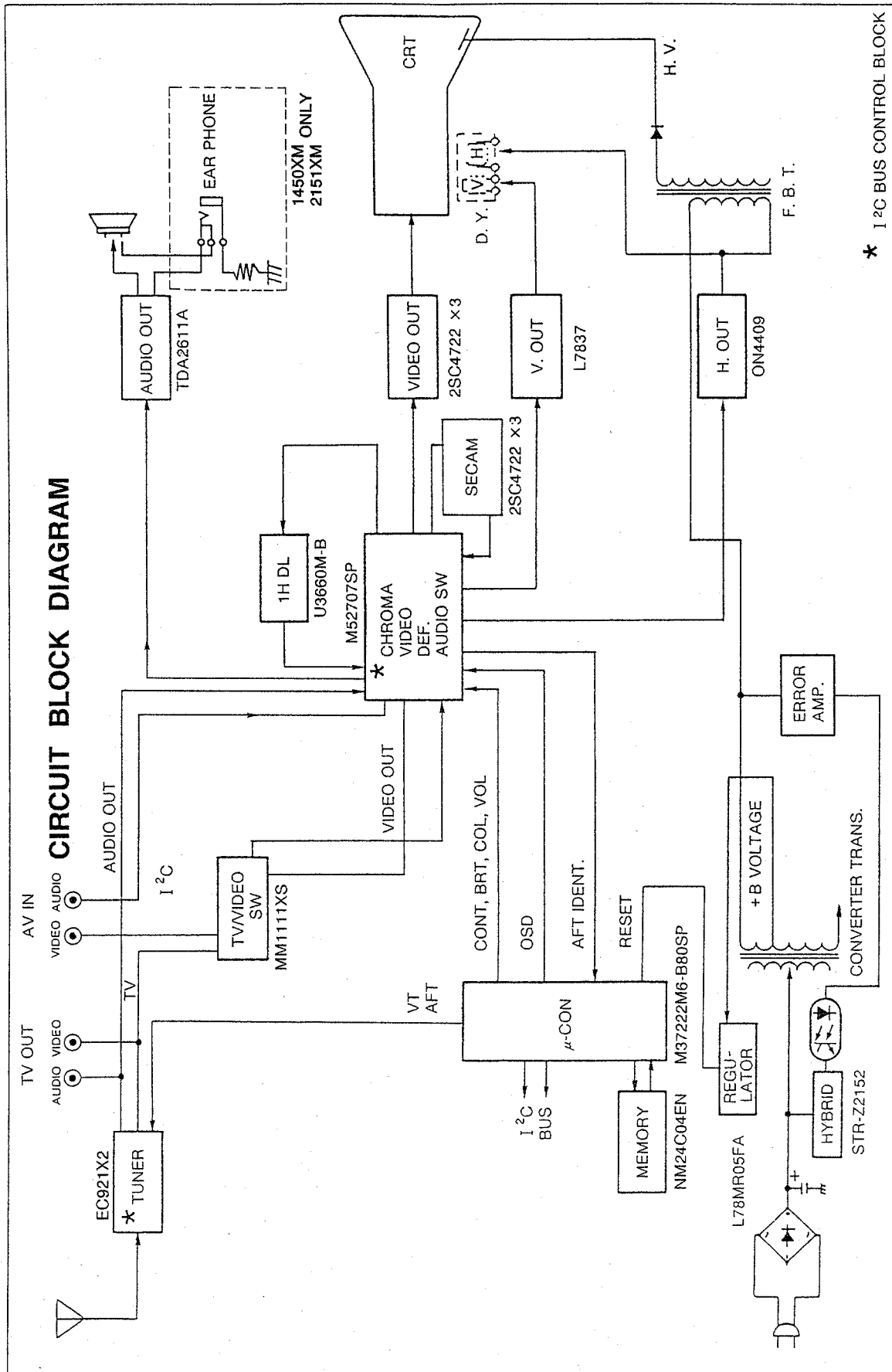
A Guide to Simple Problem Solving

- Before calling service personnel, please check the following chart for a possible cause to the trouble you are experiencing.

Symptom	Check these things
Power is not turned on.	<ul style="list-style-type: none"> • Be sure the power cord is plugged in.
No sound	<ul style="list-style-type: none"> • Earphone may be plugged in. (The earphone jack is for the 1450 model series only.)
Abnormal colour/sound	<ul style="list-style-type: none"> • Be sure the colour system and the sound system are correct. (Refer to the table on page 7.)
Poor colour/tint	<ul style="list-style-type: none"> • May be the misadjustment for contrast, colour and tint. • If you change the direction of the TV while the TV is activated, the picture may suffer from colour shading. If so, turn off the TV and allow for about 30 minutes to cool, then turn on the TV again. The picture should improve.
Spots appear on the screen.	<ul style="list-style-type: none"> • May be jamming from cars, motorcycles, electric trains, high tension lines, neon signs, hair dryers, etc.
Lines appear on the screen.	<ul style="list-style-type: none"> • May be jamming from other TV receivers, personal computers, and TV games, as well as interference from radio station.
Double or triple images	<ul style="list-style-type: none"> • May be due to broadcast waves reflected from mountains or buildings. • Check if the direction of the aerial has changed because of strong wind, etc.
Snowy picture	<ul style="list-style-type: none"> • The aerial lead-in may be broken or disconnected. • Check if the direction of the aerial has changed.
Remote Controller does not work.	<ul style="list-style-type: none"> • The batteries in the Remote Controller may be exhausted. • The batteries may be improperly installed. • Check that there is no obstruction between the Remote Controller and the remote (infrared) sensor. • Check that a strong light is shining on the remote (infrared) sensor. • Check that the main power is not turned off.

The following are not failures

The cabinet clicks.	<ul style="list-style-type: none"> • The clicking is a creaking sound produced when the cabinet expands or contracts due to changes in the temperature. This will not affect the picture or sound.
Unevenness in colour sometimes develops in part of the screen.	<ul style="list-style-type: none"> • If the screen is set brightly, such unevenness in colour may occur depending upon the nature of the picture. The proper colour can be restored by reducing the contrast. Consult your local dealer.



WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 2 OF THIS MANUAL.

INSTALLATION AND SERVICE ADJUSTMENTS

GENERAL INFORMATION

All adjustments are thoroughly checked and corrected when the receiver leaves the factory. Therefore the receiver should operate normally and produce proper colour and B/W pictures upon installation. However, several minor adjustments may be required depending on the particular location in which the receiver is operated.

This receiver is shipped completely in cardboard carton. Carefully draw out the receiver from the carton and remove all packing materials. Plug the power cord into a convenient 110 ~ 240 volts 50/60Hz AC two pin power outlet.

Turn the receiver ON and adjust the FINE TUNING for best picture detail with the AFC turned OFF.

Check and adjust all the customer controls such as BRIGHTNESS, CONTRAST and COLOUR Controls to obtain natural colour or B/W picture.

AUTOMATIC DEGAUSSING

A degaussing coil is mounted around the picture tube so that external degaussing after moving the receiver is normally unnecessary, providing the receiver is properly degaussed upon installation. The degaussing coil operates for about 1 second after the power to the receiver is switched ON. If the set is moved or faced in a different direction, the power switch must be switched off at least one hour in order that the automatic degaussing circuit operates properly.

Should the chassis or parts of the cabinet become magnetized to cause poor colour purity, use an external degaussing coil. Slowly move the degaussing coil around the faceplate of the picture tube, the sides and front of the receiver and slowly withdraw the coil to a distance of about 2 m before disconnecting it from AC source. If colour shading still persists, perform the COLOUR PURITY ADJUSTMENT and CONVERGENCE ADJUSTMENTS procedures, as mentioned later.

HIGH VOLTAGE CHECK

CAUTION: There is no HIGH VOLTAGE ADJUSTMENT on this chassis.

1. Connect an accurate high voltage meter to the second anode of the picture tube.
2. Turn on the receiver. Set the BRIGHTNESS and CONTRAST Controls to minimum (zero beam current).
3. High voltage will be measured below 29kV*.
4. Rotate the BRIGHTNESS Control to both extremes to be sure the high voltage does not exceed the limit of 29kV* under any conditions. *2050/1450XM: 26kV.

HEIGHT ADJUSTMENT

1. Receive the WG PHILIPS pattern, and set the contrast to max and set the colour and the brightness to center.
2. Adjust HEIGHT Control (R350) so that white blocks at top and bottom of picture are just masked.

FOCUS ADJUSTMENT

Adjust FOCUS Control on FLYBACK TRANS. (T461) for well defined scanning lines in the centre area on the screen.

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 2 OF THIS MANUAL.

SET-UP ADJUSTMENT

- The following adjustments should be made when a complete realignment is required or a new picture tube is installed.

Perform the adjustments in order as follows :

1. Color Purity
2. Convergence
3. White Balance (See page 25.)

Note: The PURITY/CONVERGENCE MAGNET assembly and rubber wedges need mechanical positioning.
Refer to figure 2.

COLOR PURITY ADJUSTMENT

NOTE : Before attempting any purity adjustments, the receiver should be operated for at least fifteen minutes.

1. Demagnetize the picture tube and cabinet using a degaussing coil.
2. Set the brightness and contrast to maximum.
3. Use a green raster from among the built-in test signals. See page 23.
4. Loosen the clamp screw holding the yoke and slide the yoke backward or forward to provide vertical green belt (zone) in the picture screen.
5. Remove the Rubber Wedges.
6. Rotate and spread the tabs of the purity magnet (See figure 3.) around the neck of the picture tube until the green belt is in the center of the screen. At the same time, enter the raster vertically.
7. Slowly move the yoke forward or backward until a uniform green screen is obtained. Tighten the clamp screw of the yoke temporarily.
8. Check the purity of the red and blue raster.

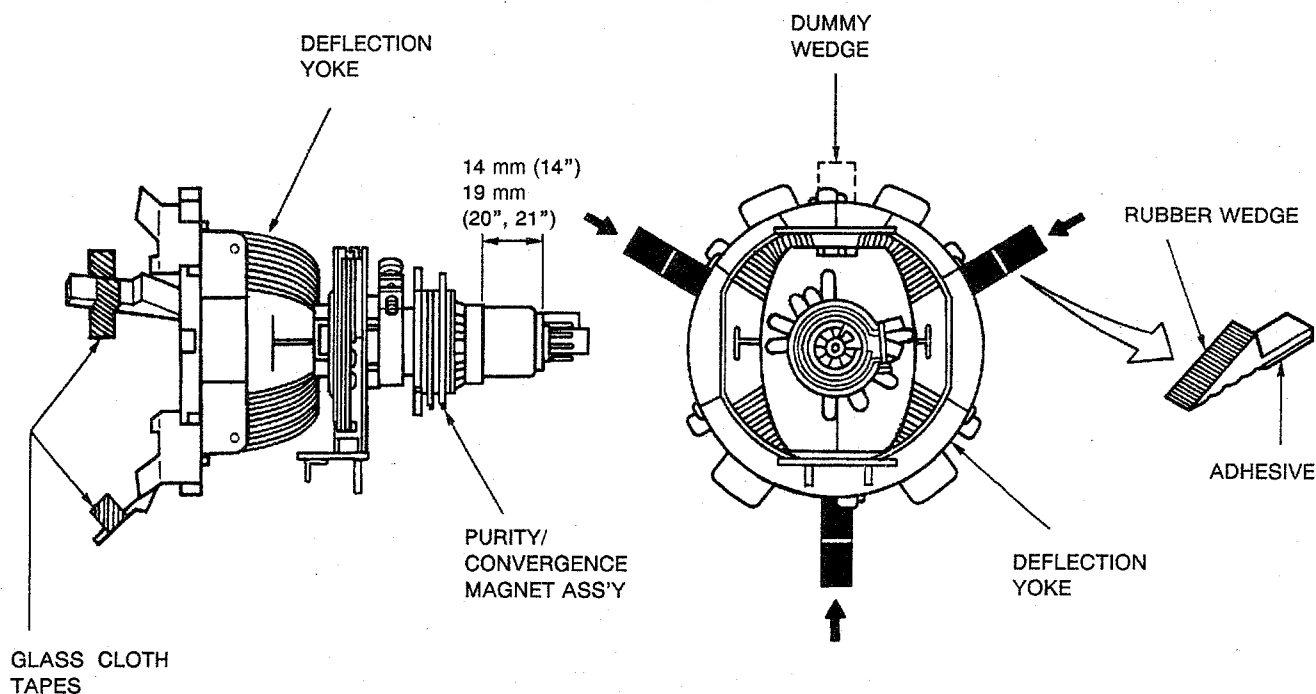


Figure 2.

CONVERGENCE ADJUSTMENTS

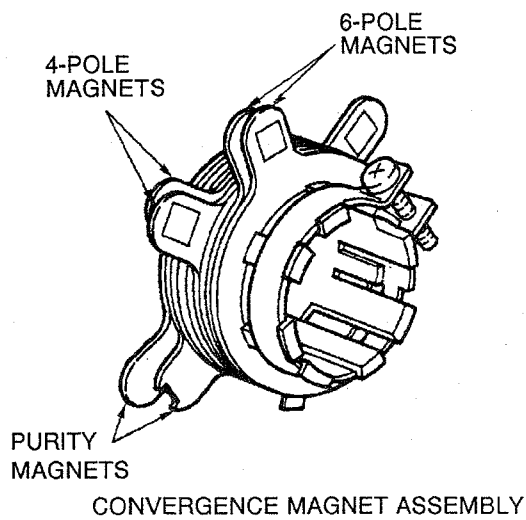
NOTE: Before attempting any convergence adjustments, the receiver should be operated for at least fifteen minutes.

■ CENTER CONVERGENCE ADJUSTMENT

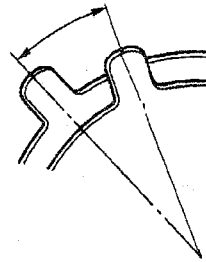
1. Use the cross-dot pattern from among the built-in test signals. See page 23.
2. Set the brightness and contrast for well defined pattern.
3. Adjust two tabs of the 4-Pole Magnets to change the angle between them (See figure 3.) and superimpose red and blue vertical lines in the center area of the picture screen.
4. Turn the both tabs at the same time keeping the angle constant to superimpose red and blue horizontal lines at the center of the screen.
5. Adjust two tabs of 6-Pole Magnets to superimpose red/blue line and green one. Adjusting the angle affects the vertical lines and rotating both magnets affects the horizontal lines.
6. Repeat adjustments 3, 4, 5 keeping in mind red, green and blue movement, because 4-Pole Magnets and 6-Pole Magnets have mutual interaction and make dot movement complex.

■ CIRCUMFERENCE CONVERGENCE ADJUSTMENT

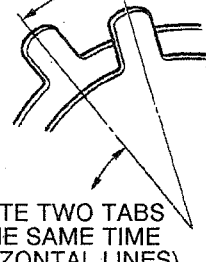
1. Loosen the clamping screw of deflection yoke slightly to allow the yoke to tilt.
2. Temporarily put a wedge as shown in figure 2. (Do not remove cover paper on adhesive part of the wedge.)
3. Tilt front of the deflection yoke up or down to obtain better convergence in circumference. (See figure 4.) Push the mounted wedge into the space between picture tube and the yoke to fix the yoke temporarily.
4. Put other wedge into bottom space and remove the cover paper to stick.
5. Tilt front of the yoke right or left to obtain better convergence in circumference. (See figure 4.)
6. Keep the yoke position and put another wedge in either upper space. Remove cover paper and stick the wedge on picture tube to fix the yoke.
7. Detach the temporarily mounted wedge and put it in another upper space. Stick it on picture tube to fix the yoke.
8. After fixing three wedges, recheck overall convergence.
Tighten the screw firmly to fix the yoke and check the yoke is firm.
9. Stick three adhesive tapes on wedges as shown in figure 2.



ADJUST THE ANGLE
(VERTICAL LINES)



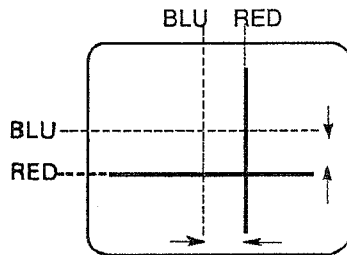
FIXED



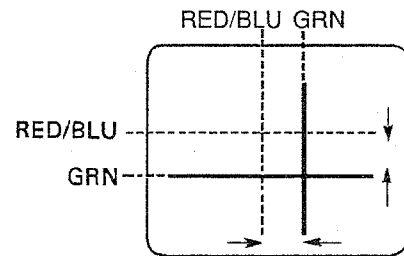
ROTATE TWO TABS
AT THE SAME TIME
(HORIZONTAL LINES)

ADJUSTMENT OF MAGNETS

Figure 3.

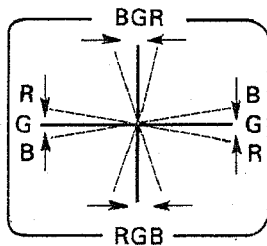


4-POLE MAGNETS MOVEMENT

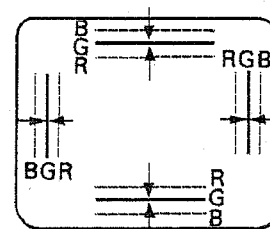


6-POLE MAGNETS MOVEMENT

Center Convergence by Convergence Magnets



INCLINE THE YOKE UP (OR DOWN)



INCLINE THE YOKE RIGHT (OR LEFT)

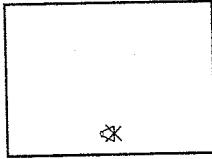
Circumference Convergence by DEF Yoke

Figure 4. Dot Movement Pattern

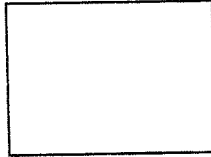
SERVICE MODE GENERAL INSTRUCTIONS

1. ENTERING TO SERVICE MODE

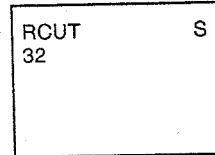
1) Press \times button once on Remote Control.



2) Press \times button again to keep pressing.



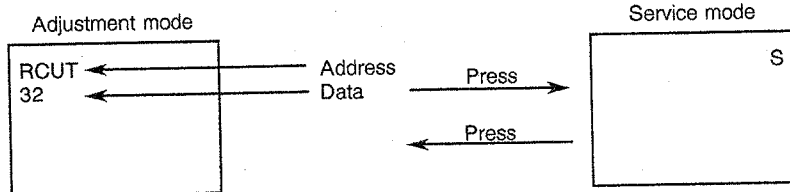
3) Keep pressing the \times button, press MENU button on TV set.



(Service mode display)

2. DISPLAYING THE ADJUSTMENT MENU

Press MENU button on TV.



3. SELECTING THE ADJUSTING ITEMS

Every pressing of CHANNEL \blacktriangle button changes the adjustment items in the following order. (\blacktriangledown button for reverse order.)

4. ADJUSTING THE DATA

Pressing of VOLUME \blacktriangle or \blacktriangledown button will change the value of data in the range from 00 to FF. The variable range depends on the adjusting item.

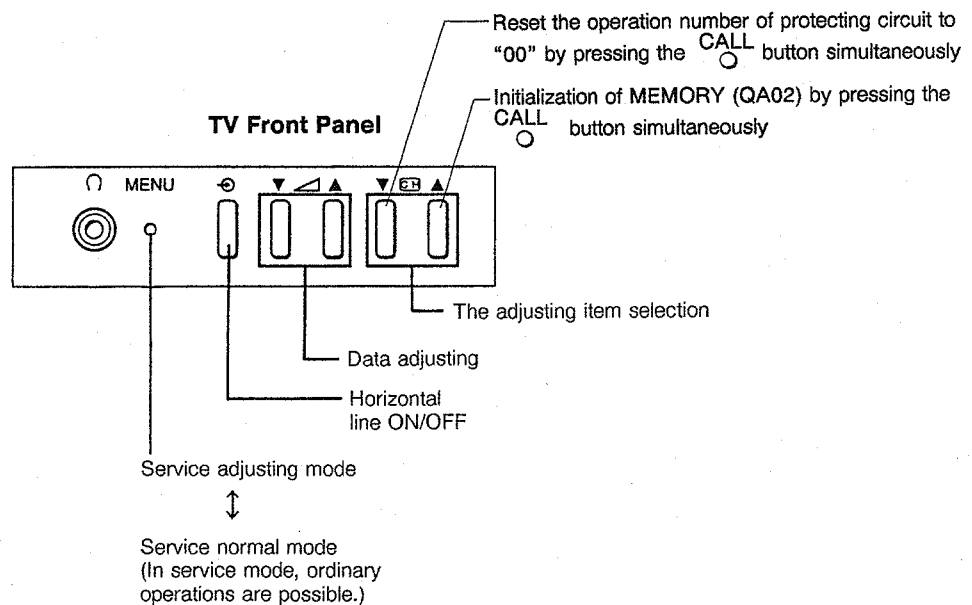
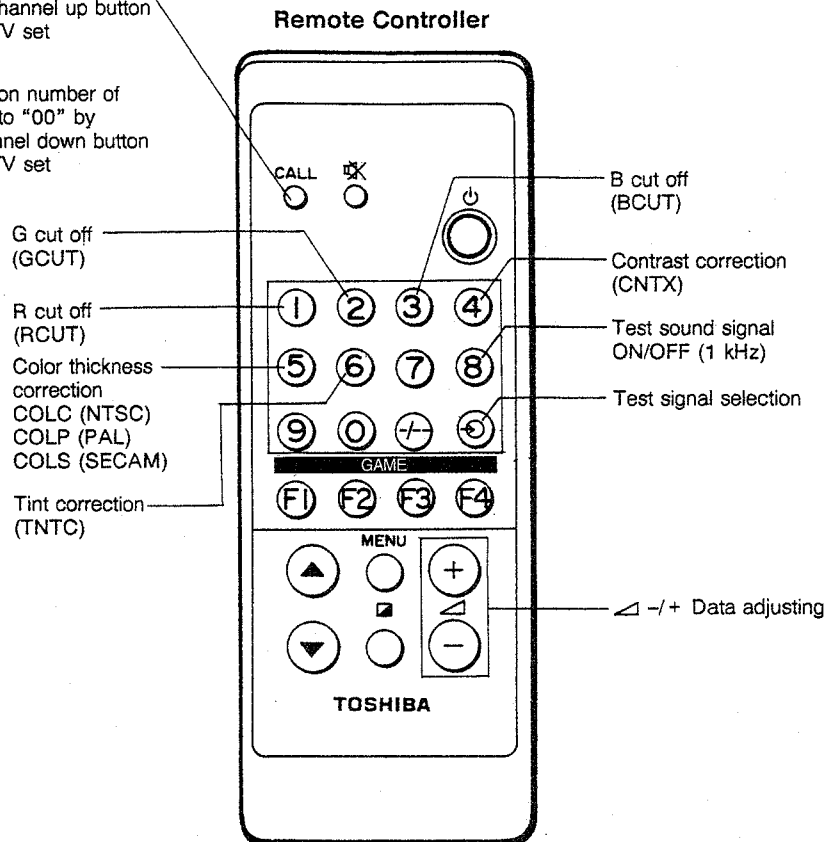
5. EXIT FROM SERVICE MODE

Press POWER button to turn off the TV once.


OTHER SERVICE FUNCTION

The following key entry during display of adjustment menu provides special functions.

- ① Initialization of MEMORY (QA02) by pressing the channel up button (▲) on the TV set simultaneously.
- ② Reset the operation number of protecting circuit to "00" by pressing the channel down button (▼) on the TV set simultaneously.



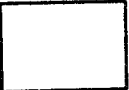


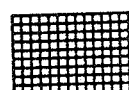
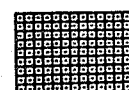

TEST SIGNAL SELECTION

Every pressing of  button changes the test patterns on screen as described below in service mode.

Signal off → NTSC signals (14 patterns)

↑ PAL signals (14 patterns) ←

- About inside signal: The inside signal is output at video input terminal from QA01, and is not output with the pin inserted into terminal. (Single color signal can be output.)

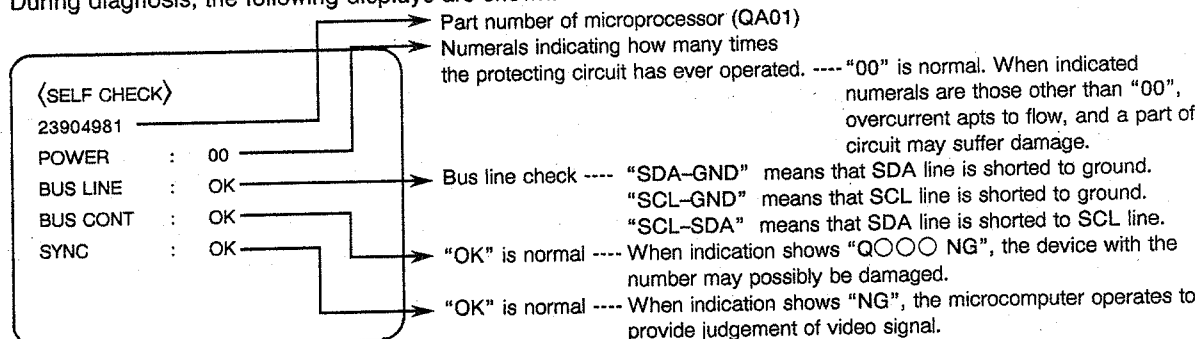
Signals	Picture	Using method
<ul style="list-style-type: none"> • Red single color • Green single color • Blue single color • Black single color • White single color 		Purity and White uniformity of CRT Red single color. . . . Stopping G and B output of Q501 Green single color. . . . Stopping R and B output of Q501 Blue single color. . . . Stopping R and G output of Q501 Black single color. . . . Making black signal of approx. 1Vp-p in QA01 White single color. . . . Making white signal of approx. 1Vp-p in QA01
<ul style="list-style-type: none"> • W/B adjustment 		White balance adjustment White part. . . . White balance adjustment/check in light area Black part. . . . White balance adjustment/check in dark area ※ Making approx. 1Vp-p signal in QA01.
<ul style="list-style-type: none"> • Black cross-bar • White cross-bar 		Picture position (horizontal, vertical and slant) in CRT adjustment ※ Making approx. 1Vp-p signal in QA01.
<ul style="list-style-type: none"> • Black cross-hatch • White cross-hatch 		Convergence and vertical amplitude adjustment ※ Making approx. 1Vp-p signal in QA01.
<ul style="list-style-type: none"> • Black cross-dot • White cross-dot 		Convergence adjustment ※ Making approx. 1Vp-p signal in QA01.
<ul style="list-style-type: none"> • H signal (Left, right, white) • H signal (Left, right, black) 		For checking (of purity drift) of white uniformity of CRT H signal (Left, right, white). . . . Check in light area H signal (Left, right, black). . . . Check in dark area The adjustment will be the best, if the time when unevenness of color in light area occurs, is a little longer than that in dark area. ※ Making approx. 1Vp-p signal in QA01.

SELF DIAGNOSTIC FUNCTION

1) Press "9" button on Remote Control during display of adjustment menu.

The diagnosis will begin to check if interface among IC's are executed properly.

2) During diagnosis, the following displays are shown.



SERVICE MODE ADJUSTMENT

ITEM	ADJUSTMENT PROCEDURE
INITIALIZATION OF QA02 (MEMORY)	<p>After replacing QA02, the following initialization is required.</p> <ol style="list-style-type: none"> 1. Call up the adjustment mode display following the steps 1 and 2 on page 21. 2. Press the RECALL and CHANNEL ▲ buttons on the Remote Control simultaneously. The initialization of QA02 has been completed. 3. Check the picture carefully. If necessary, adjust any adjustment item. Perform "AUTOMATIC SEARCH MEMORY" on page 8.
SUB-BRIGHTNESS (Address : BRTC)	<ol style="list-style-type: none"> 1. Set CONTRAST to "00", and BRIGHTNESS to "50" by adjusting user controls. 2. Set the TV in service mode to get white cross-bar of inside pattern. 3. Select BRTC (brightness correction), and adjust the ◀ - / + button to reduce the value so that white portion of inside pattern slightly light. 4. Rotate R350 to show the belt of vertical retrace. See figure right. 5. Adjust ◀ - / + button to increase the data value of BRTC, and set it just before the difference between the belt of vertical retrace and the border of black portion of inside pattern is visible. After that, return vertical height and contrast. <div data-bbox="1082 712 1428 981" data-label="Image"> <p style="text-align: right;">Belt of vertical retrace</p> </div>
HORIZONTAL POSITION ADJUSTMENT (HPOS) VERTICAL POSITION ADJUSTMENT (VPOS)	<ol style="list-style-type: none"> 1. Set the TV in service mode, and get black or white cross-bar signal with VIDEO button on remote hand unit. 2. Select either HPOS (Horizontal picture phase) or VPOS (Vertical picture phase) with CHANNEL ▲, ▼ buttons, and adjust horizontal or vertical picture position in the center of screen with VOLUME ◀ - / + buttons. <div data-bbox="1018 1211 1417 1503" data-label="Image"> </div>
VERTICAL AMPLITUDE ADJUSTMENT (HIT)	<ol style="list-style-type: none"> 1. Set the TV in service mode, and get black or white cross-hatch signal with VIDEO button on remote hand unit. 2. Select HIT (Vertical amplitude) with CHANNEL ▲, ▼ buttons, and adjust vertical amplitude with VOLUME ◀ - / + buttons so that vertical amplitude lacks a little. 3. Adjust vertical amplitude with VOLUME ◀ - / + buttons so that the first bar on cross-hatch signal touches edge of screen. <div data-bbox="1034 1570 1444 1861" data-label="Image"> <p>The first </p> </div>

ITEM	ADJUSTMENT PROCEDURE
<p>WHITE BALANCE ADJUSTMENT</p> <ul style="list-style-type: none"> • CUTOFF ADJUSTMENT (RCUT) (GCUT) (BCUT) • DRIVE ADJUSTMENT (GDRV) (BDRV) 	<ol style="list-style-type: none"> 1. Set Contrast to 40, and brightness to +20 by picture control. 2. Set the TV in service mode (page 21), and get the inside W/B adjusting signal with VIDEO button. (page 23) 3. Select RCUT, GCUT and BCUT with CHANNEL ▲, ▼ buttons, to set individual values to 32, and to set GDRV and BDRV to 20 with VOLUME ▲ - / + buttons. 4. Press VIDEO button on TV set and rotate Screen VR to get one slight horizontal line on screen. Note: Every pressing of VIDEO button provides Horizontal line picture and Normal picture alternately. 5. Press VIDEO button to release horizontal line picture, and select the two other colors which did not light in the above step with CHANNEL ▲, ▼ buttons. Then tap VOLUME ▲ - / + buttons so that three colors slightly light in the same level. <p>※ To correct white balance in light area, select GDRV and BDRV with CHANNEL ▲, ▼ buttons to adjust.</p> <p>※ To correct white balance in dark area, perform fine adjustment of RCUT, GCUT and BCUT.</p> <div data-bbox="1042 762 1435 1058"> <div data-bbox="1108 762 1372 844">Light area check (to show white)</div> <div data-bbox="1149 982 1331 1046">Dark area check (to show black)</div> </div>

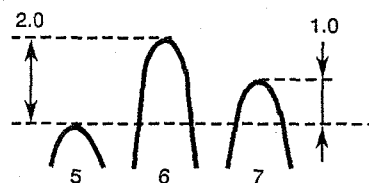
ADJUSTMENT OF VIDEO-CHROMA SYSTEM (Factory adjustment)

Model Name: S5E

Item	Name	Setting (User control)	Input signal	Measureme nt point	Adjustment procedure	Adjustment standard
Slave address 36 [BRTC]	SUB BRIGHT CENTER	Contrast: MAX Bright : CENTER Color : MIN	Sub-bright signal	Screen adjustment	1. This adjustment must be done after [BRTC], screen VR and white balance adjustments have been completed. 2. Adjust number of black collapse lines of sub-bright signal.	5 ± 1.5
Slave address 37 [COLC]	COLOR CONTROL CENTER NTSC	Contrast: MAX Bright : CENTER Color : CENTER Tint : CENTER	Sub-bright signal (3.58NTSC)	IC501 #23... (B-OUT)	1. Select slave address 37 [COLC]. 2. When [COLC] is selected, Y- signal is muted and only color signals are outputted. (This adjustment must be done after [TNTC] has been adjusted.) 3. Adjust amplitude of the upper half of the rainbow color bar output.	1.4V(p-p) $\pm 0.2V(p-p)$
Slave address 39 [COLP]	SUB COLOR PAL	Contrast: MAX Bright : CENTER Color : CENTER	PHILIPS signal (PAL)	IC501 #23... (B-OUT)	1. Select slave address 39 [COLP]. 2. When [COLP] is selected, Y- signal is muted and only color signals are outputted. (This adjustment must be done after [COLC] has been adjusted.) 3. Adjust amplitude of the upper half of the color bar output.	1.4V(p-p) $\pm 0.2V(p-p)$
Slave address 38 [TNTC]	TINT CONTROL CENTER	Contrast: MAX Bright : CENTER Color : CENTER Tint : CENTER	Sub-bright signal (3.58NTSC)	IC501 #23... (B-OUT)	1. Select slave address 38 [TNTC]. 2. When [TNTC] is selected, Y- signal is muted and only color signals are outputted. 3. Adjust it so that 6.25 of the rainbow color bar becomes max. (See Fig.-1.)	$-5.0^\circ \pm 5.0^\circ$ (Refer to the conversion table.)
RQ50 (R-Y axis) RQ51 (B-Y axis)	SECAM W/B R-Y axis B-Y axis	Contrast: MAX Bright : CENTER Color : CENTER	SECAM color bar signal	QQ01 #9 (R-Y axis) #10 (B-Y axis)	1. Coincide the level of black and white portion of color difference signal to that of H. BLK portion. 2. Adjust RQ50 for R-Y axis and adjust RQ51 for B-Y axis. 3. Repeat the above steps because RQ50 and RQ51 affect each other.	$\pm 10mV$ or less on both axis
Slave address 3A [COLS]	SUB COLOR CENTER SECAM	Contrast: MAX Bright : CENTER Color : CENTER	SECAM color bar signal	Q501 #23 (B-OUT)	1. Select slave address 3A [COLS]. 2. When [COLS] is selected, Y signal is muted, and only color signal is output. Perform this step after the adjustment of RQ50 and RQ51. 3. Adjust the peak amplitude of color bar.	1.9V(p-p) $\pm 0.2V(p-p)$ (1450XM) (2151XM) 1.65V(p-p) $\pm 0.2V(p-p)$ (2050XM)

Model Name: S5E

Item	Name	Setting (User control)	Input signal	Measureme nt point	Adjustment procedure	Adjustment standard
Slave address 30 [RCUT] 31 [GCUT] 32 [BCUT] Screen VR	R cut-off G cut-off B cut-off Screen	RCUT) GCUT) 32 Hexa-decimal BCUT) GDRV) 20 Hexa-decimal BDRV) Select horizontal line mode by pressing ⊖ button on TV set in service mode.		Screen adjustment	1. Set the controls as shown in the left column. 2. Gradually increase the screen VR (T461) until one of R, G or B line begins to brighten slightly. 3. Determine the position of the screen VR here. 4. Adjust RCUT, GCUT and BCUT, brighten other lines until they begin to light slightly. (Adjust DATA so that the line becomes almost white.) 5. Press ⊖ button on TV set to escape from the horizontal line mode.	—
Slave address 30 [RCUT] 31 [GCUT] 32 [BCUT] 33 [GDRV] 34 [BDRV]	R cut-off G cut-off B cut-off G drive B drive (White balance)	Contrast: MAX Bright : CENTER Color : CENTER	Cross- hatch, etc.	Screen adjustment	1. This adjustment must be done after adjustment of the above- mentioned cut-off and screen VR's have been completed. 2. Adjust cut-off and drive DATA alternately. 3. Use a checker to adjust brightness by changing modulation factor.	HIGH LIGHT; (103cd/m ³) 11500K +0.0075uv DARK; (17cd/m ³) 10500K +0.0105uv
Slave address F0 PID	ID ref		VIDEO No input	Pin 52 of IC501	1. Connect a resistor 220k ohm across pin 52 of IC501 and GND, and connect digital voltmeter. 2. Select slave address F0 PID . 3. Adjust DC voltage.	2.0V DC ±0.1V DC
Slave address F1 TRP	Chroma trap f ₀ adjusting	Contrast: MAX Bright : MIN Color : MIN	4.43NTSC color bar	Pin 23 of IC501 (B-OUT)	1. Select slave address F1 TRP . 2. Adjust chroma trap so that chroma level at pin 23 of IC501 becomes minimum.	Chroma level: MIN

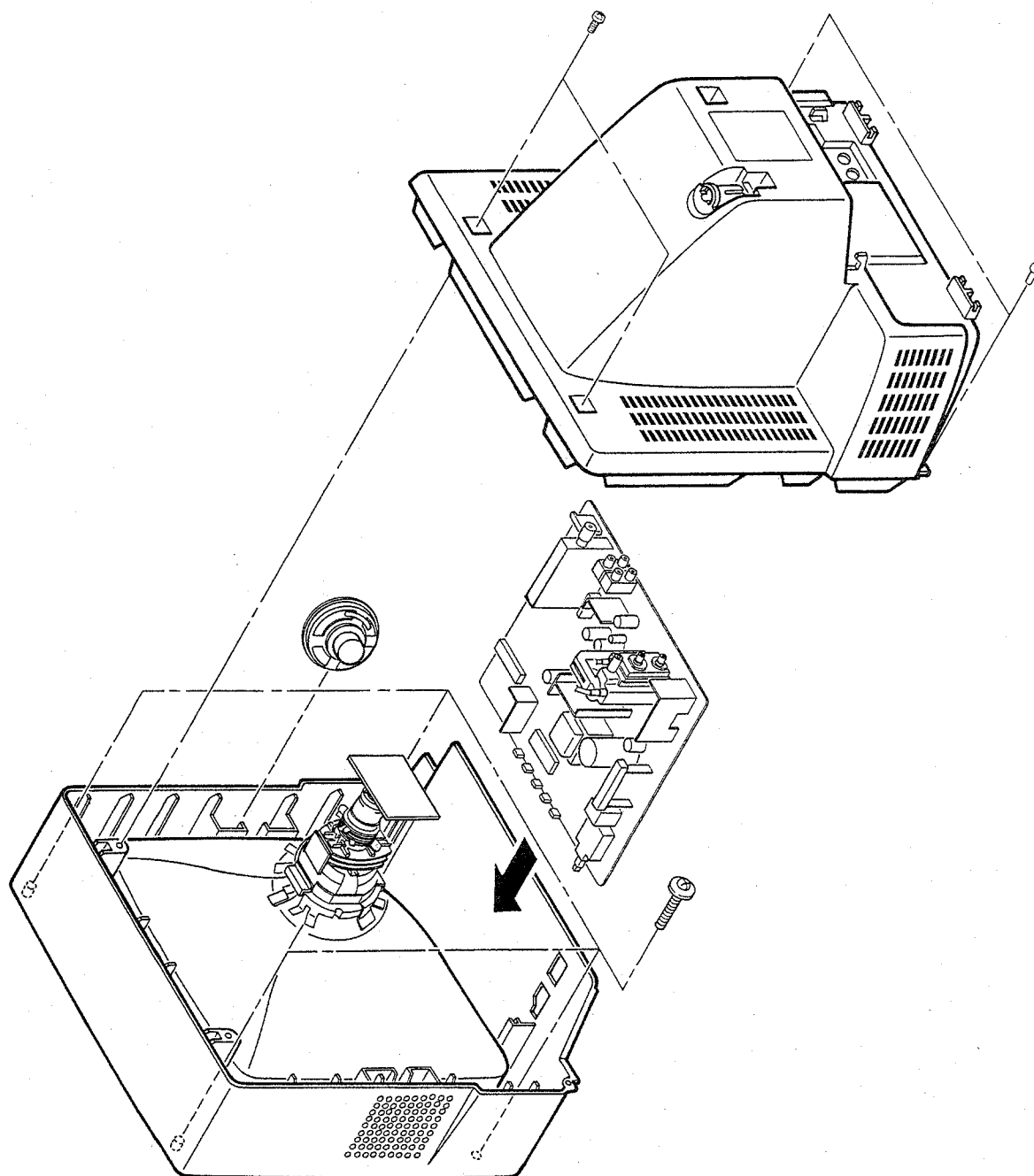


Status of TCC 6.25
Fig.-1

MULTI BUS E2PROM ADDRESS, ADJUSTING ADDRESS TABLE

Adjusting method	Micom adjusting number	QA02 memory ADDR	Name of item	Value of initializing QA02 (Hexa-decimal)	Adjustments
F ↓ F	30	06D	RCUT	32	R CUTOFF
	31	06E	GCUT	32	G CUTOFF
	32	06F	BCUT	32	B CUTOFF
	33	070	GDRV	20	G DRIVE
	34	071	BDRV	20	B DRIVE
	35	072	CNTX	39	SUBCONTRAST MAX
	36	073	BRTC	32	SUBBRIGHT CEN
	37	074	COLC	32	SUBCOLOR CEN NTSC
	38	075	TNTC	39	SUBTINT CEN
	39	076	COLP	32	SUBCOLOR CEN PAL
	3A	077	COLS	32	SUBCOLOR CEN SECAM
	80	08F	HPOS	08	50Hz HORIZONTAL POSITION

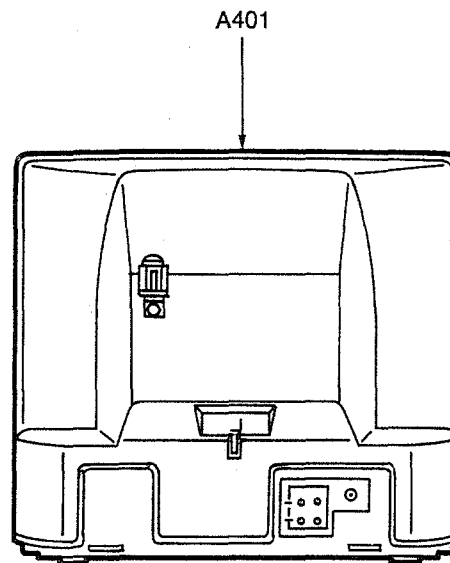
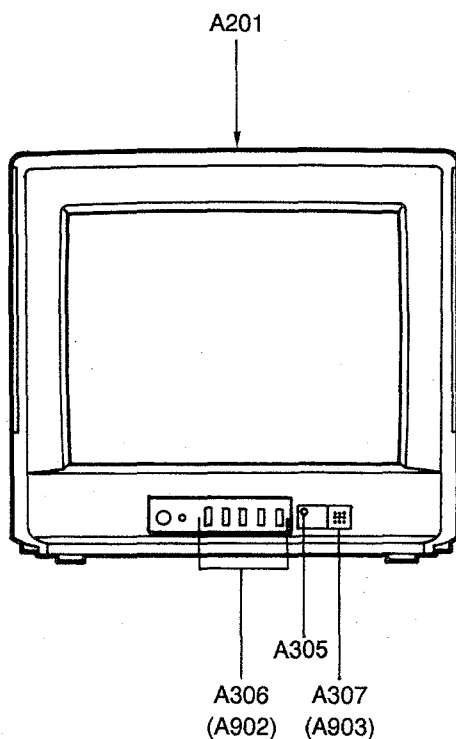
F ... This item may require adjustments by models after initialization, when QA02 is replaced.



1450XM (Representative of others)

CABINET REPLACEMENT PARTS LIST

1450XM (Representative of others)



1450XM

Location No.	Part No.	Description
A201	23410659	Front Cover
A302	23450020	Filter
A303	23836494	Spring
A305	23430216	Indicator
A306	23443932	Button, Control
A307	23443931	Knob, POWER
△ A401	23426552	Back Cover
A451	23569533	Label, B/C, (1450XM)

2050XM

Location No.	Part No.	Description
A201	23410657	Front Cover
A302	23430230	Filter
A303	23836494	Spring
A305	23430231	Indicator
A306	23443937	Button, Control
A307	23443955	Knob, POWER
△ A401	23426550	Back Cover
A451	23569603	Label, B/C, (2050XM)

2151XM

Location No.	Part No.	Description
A201	23410652	Front Cover
A355	23832473	Holder, Antenna
A401	23426543	Back Cover
A420	23845511	Band, Safety
A902	23443995	Button, 6-key
A903	23443996	Button, POWER
A904	23836493	Spring, POWER

CHASSIS REPLACEMENT PARTS LIST

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE" ON PAGE 2 OF THIS MANUAL.

CAUTION: The international hazard symbols "△" in the schematic diagram and the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list. The mounting position of replacements is to be identical with originals. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE on page 2. Do not degrade the safety of the receiver through improper servicing.

NOTICE:

- The part number must be used when ordering parts, in order to assist in processing, be sure to include the Model number and Description.
- The PC board assembly with * mark is no longer available after the end of the production.

ABBREVIATIONS:

Capacitors.....	CD : Ceramic Disk	PF : Plastic Film	EL : Electrolytic
Resistors.....	CF : Carbon Film	CC : Carbon Composition	MF : Metal Film
	OMF : Oxide Metal Film	VR : Variable Resistor	FR : Fusible Resistor

(All CD and PF capacitors are $\pm 5\%$, 50V and all resistors, $\pm 5\%$, 1/6W unless otherwise noted.)

Location No.	Part No.	Description
CAPACITORS		
C101	24797100	EL, 10 μ F, $\pm 20\%$, 50V
C102	24794101	EL, 100 μ F, $\pm 20\%$, 16V
C103	24232103	CD, 0.01 μ F, +80%, -20%
C201	24797478	EL, 0.47 μ F, $\pm 20\%$, 50V
C207	24232103	CD, 0.01 μ F, +80%, -20%
C211	24794470	EL, 47 μ F, $\pm 20\%$, 16V
C212	24794100	EL, 10 μ F, $\pm 20\%$, 16V
C214	24794101	EL, 100 μ F, $\pm 20\%$, 16V
C215	24763471	EL, 470 μ F, $\pm 20\%$, 16V
C216	24232103	CD, 0.01 μ F, +80%, -20%
C219	24794100	EL, 10 μ F, $\pm 20\%$, 16V
C220	24591104	PF, 0.1 μ F
C221	24591104	PF, 0.1 μ F
C222	24591104	PF, 0.1 μ F
C230	24794100	EL, 10 μ F, $\pm 20\%$, 16V
C301	24436561	CD, 560pF
C302	24591103	PF, 0.01 μ F
C303	24617915	EL, 1 μ F, $\pm 10\%$, 50V
C305	24617912	EL, 2.2 μ F, $\pm 10\%$, 50V (1450XM/2050XM)
C305	24617915	EL, 1 μ F, $\pm 10\%$, 50V (2151XM)
C306	24666332	EL, 3300 μ F, $\pm 20\%$, 16V
C307	24214472	CD, 4700pF, $\pm 10\%$, 500V
C308	24668101	EL, 100 μ F, $\pm 20\%$, 35V
C309	24434100	CD, 10pF, ± 0.5 pF, 500V
C310	24796102	EL, 1000 μ F, $\pm 20\%$, 35V
C313	24082057	PF, 0.22 μ F, 100V
C317	24214471	CD, 470pF, $\pm 10\%$, 500V
C321	24666101	EL, 100 μ F, $\pm 20\%$, 16V
C402	24591562	PF, 5600pF
C403	24232103	CD, 0.01 μ F, +80%, -20%
C404	24797010	EL, 1 μ F, $\pm 20\%$, 50V
C405	24212182	CD, 1800pF, $\pm 10\%$
C406	24085958	EL, 1.0 μ F, $\pm 20\%$, 50V, Non-Polar
C408	24794470	EL, 47 μ F, $\pm 20\%$, 16V
C409	24474221	CD, 220pF, $\pm 10\%$ (2151XM only)
C417	24214102	CD, 1000pF, $\pm 10\%$, 500V
C421	24538474	PF, 0.47 μ F

Location No.	Part No.	Description
C422	24538474	PF, 0.47 μ F
C430	24232103	CD, 0.01 μ F, +80%, -20%
C431	24794102	EL, 1000 μ F, $\pm 20\%$, 16V
C440	24082545	PF, 7100pF, $\pm 3\%$, 1500V (1450XM)
C440	24082552	PF, 8700pF, $\pm 3\%$, 1500V (2050XM)
C440	24082576	PF, 6000pF, $\pm 3\%$, 1500V (2151XM)
C442	24082694	PF, 0.33 μ F, 250V
C444	24082557	PF, 1200pF, $\pm 3\%$, 1500V (2151XM only)
C445	24828563	PF, 0.056 μ F, 200V
C446	24700220	EL, 22 μ F, $\pm 20\%$, 250V
C448	24640908	EL, 33 μ F, $\pm 20\%$, 160V
C449	24666471	EL, 470 μ F, $\pm 20\%$, 16V
C463	24212152	CD, 1500pF, $\pm 10\%$
C467	24095881	PF, 0.018 μ F, $\pm 3\%$, 630V (2151XM only)
C470	24794220	EL, 22 μ F, $\pm 20\%$, 16V
C472	24538474	PF, 0.47 μ F
C501	24473680	CD, 68pF
C502	24473680	CD, 68pF
C503	24473680	CD, 68pF
C504	24353560	CD, 56pF
C506	24591153	PF, 0.015 μ F
C507	24353101	CD, 100pF
C510	24797010	EL, 1 μ F, $\pm 20\%$, 50V
C511	24474101	CD, 100pF, $\pm 10\%$
C512	24474101	CD, 100pF, $\pm 10\%$
C520	24436471	CD, 470pF
C530	24591473	PF, 0.047 μ F
C531	24591473	PF, 0.047 μ F
C560	24797010	EL, 1 μ F, $\pm 20\%$, 50V
C561	24212182	CD, 1800pF, $\pm 10\%$
C606	24797479	EL, 4.7 μ F, $\pm 20\%$, 50V
C607	24797100	EL, 10 μ F, $\pm 20\%$, 50V
C608	24797229	EL, 2.2 μ F, $\pm 20\%$, 50V
C609	24591103	PF, 0.01 μ F
C610	24795220	EL, 22 μ F, $\pm 20\%$, 25V
C611	24591104	PF, 0.1 μ F

Location No.	Part No.	Description
C612	24794470	EL, 47 μ F, \pm 20%, 16V
C613	24796221	EL, 220 μ F, \pm 20%, 35V
C614	24797478	EL, 0.47 μ F, \pm 20%, 50V
C801	24082374	PF, 0.22 μ F, AC250V
C805	24092300	CD, 0.01 μ F, +80%, -20%, AC250V
C806	24092300	CD, 0.01 μ F, +80%, -20%, AC250V
C810	24086054	EL, 270 μ F, \pm 20%, 450V
C813	24094655	CD, 1000pF, \pm 20%, AC400V
C814	24094655	CD, 1000pF, \pm 20%, AC400V
C819	24538474	PF, 0.47 μ F
C832	24666470	EL, 47 μ F, \pm 20%, 16V
C841	24667100	EL, 10 μ F, \pm 20%, 25V
C842	24666100	EL, 10 μ F, \pm 20%, 16V
C843	24538104	PF, 0.1 μ F
C846	24538224	PF, 0.22 μ F
C861	24214471	CD, 470pF, \pm 10%, 500V
C862	24082857	PF, 680pF, \pm 2%
C863	24538104	PF, 0.1 μ F
C864	24092333	CD, 100pF, \pm 10%, 2kV
C866	24669100	EL, 10 μ F, \pm 20%, 50V
C868	24676470	EL, 47 μ F, \pm 20%, 100V
C869	24678229	EL, 2.2 μ F, \pm 20%, 200V
C871	24092483	CD, 1200pF, \pm 10%, 2kV
C872	24212102	CD, 1000pF, \pm 10%
C873	24212102	CD, 1000pF, \pm 10%
C876	24538104	PF, 0.1 μ F
C877	24667470	EL, 47 μ F, \pm 20%, 25V
C884	24640018	EL, 220 μ F, \pm 20%, 160V
C885	24214471	CD, 470pF, \pm 10%, 500V
C889	24667471	EL, 470 μ F, \pm 20%, 25V
C891	24082229	PF, 0.1 μ F, \pm 10%, 250V
C893	24092338	CD, 270pF, \pm 10%, 2kV
C894	24092338	CD, 270pF, \pm 10%, 2kV
C898	24212102	CD, 1000pF, \pm 10%
C899	24212271	CD, 270pF, \pm 10%
C902	24211102	CD, 1000pF, \pm 10%, 2kV
C921	24212471	CD, 470pF, \pm 10% (1450XM)
C921	24212821	CD, 820pF, \pm 10% (2050XM)
C921	24212561	CD, 560pF, \pm 10% (2151XM)
C922	24212471	CD, 470pF, \pm 10% (1450XM)
C922	24212821	CD, 820pF, \pm 10% (2050XM)
C922	24212561	CD, 560pF, \pm 10% (2151XM)
C923	24212471	CD, 470pF, \pm 10% (1450XM)
C923	24212821	CD, 820pF, \pm 10% (2050XM)
C923	24212561	CD, 560pF, \pm 10% (2151XM)
C971	24763221	EL, 220 μ F, \pm 20%, 16V
C972	24794100	EL, 10 μ F, \pm 20%, 16V
C980	24763471	EL, 470 μ F, \pm 20%, 16V
C981	24797479	EL, 4.7 μ F, \pm 20%, 50V
CA10	24474151	CD, 150pF, \pm 10%
CA11	24474151	CD, 150pF, \pm 10%
CA33	24232103	CD, 0.01 μ F, +80%, -20%
CA36	24474101	CD, 100pF, \pm 10%
CA37	24474101	CD, 100pF, \pm 10%
CA38	24474101	CD, 100pF, \pm 10%
CA42	24794100	EL, 10 μ F, \pm 20%, 16V
CA43	24232103	CD, 0.01 μ F, +80%, -20%
CA68	24794100	EL, 10 μ F, \pm 20%, 16V
CA69	24232103	CD, 0.01 μ F, +80%, -20%
CB01	24794470	EL, 47 μ F, \pm 20%, 16V
CB20	24474101	CD, 100pF, \pm 10%
CP01	24538104	PF, 0.1 μ F

Location No.	Part No.	Description
CP03	24538104	PF, 0.1 μ F
CP04	24538104	PF, 0.1 μ F
CP05	24591103	PF, 0.01 μ F
CP06	24591103	PF, 0.01 μ F
CP07	24794470	EL, 47 μ F, \pm 20%, 16V
CP08	24591223	PF, 0.022 μ F
CQ01	24797470	EL, 47 μ F, \pm 20%, 50V
CQ02	24538104	PF, 0.1 μ F
CQ03	24591224	PF, 0.22 μ F
CQ04	24538104	PF, 0.1 μ F
CQ05	24591103	PF, 0.01 μ F
CQ06	24232103	CD, 0.01 μ F, +80%, -20%
CS02	24797010	EL, 1 μ F, \pm 20%, 50V
CS03	24797478	EL, 0.47 μ F, \pm 20%, 50V
CS04	24797478	EL, 0.47 μ F, \pm 20%, 50V
CS05	24794221	EL, 220 μ F, \pm 20%, 16V
CS06	24793471	EL, 470 μ F, \pm 20%, 10V
CS07	24794101	EL, 100 μ F, \pm 20%, 16V
CS08	24797479	EL, 4.7 μ F, \pm 20%, 50V
CV05	24794100	EL, 10 μ F, \pm 20%, 16V
CV06	24232103	CD, 0.01 μ F, +80%, -20%
CV07	24591104	PF, 0.1 μ F
CV08	24794100	EL, 10 μ F, \pm 20%, 16V

RESISTORS

R101	24382153	OMF, 15k ohm, 1W
R207	24366102	CF, 1k ohm
R208	24366101	CF, 100 ohm
R209	24366101	CF, 100 ohm
R211	24366103	CF, 10k ohm
R212	24366474	CF, 470k ohm (2050XM)
R212	24366224	CF, 220k ohm (1450XM/2151XM)
R214	24366103	CF, 10k ohm
R215	24366153	CF, 510k ohm
R219	24366511	CF, 1k ohm
R227	24366333	CF, 33k ohm (1450XM)
R227	24366123	CF, 12k ohm (2050XM/2151XM)
R301	24366332	CF, 3300 ohm
R302	24366683	CF, 68k ohm
R303	24552102	OMF, 1k ohm, 1/2W (1450XM)
R303	24552122	OMF, 1200 ohm, 1/2W (2050XM)
R303	24552751	OMF, 750 ohm, 1/2W (2151XM)
R304	24366153	CF, 15k ohm (1450XM)
R304	24366223	CF, 22k ohm (2050XM)
R304	24366243	CF, 24k ohm (2151XM)
R305	24322139	MF, 1.3 ohm, 1W (1450XM)
R305	24322129	MF, 1.2 ohm, 1W (2050XM)
R305	24322119	MF, 1.1 ohm, 1W (2151XM)
R306	24366183	CF, 18k ohm (1450XM)
R306	24366243	CF, 24k ohm (2050XM)
R306	24366363	CF, 36k ohm (2151XM)
R307	24366823	CF, 82k ohm (1450XM)
R307	24366823	CF, 82k ohm (2050XM)
R307	24366134	CF, 130k ohm (2151XM)
R309	24321109	MF, 1 ohm, 1/2W
R310	24366102	CF, 1k ohm
R311	24366103	CF, 10k ohm (1450XM)
R311	24366332	CF, 3300 ohm (2050XM)
R311	24366432	CF, 4300 ohm (2151XM)

Location No.	Part No.	Description
R312	24366363	CF, 36k ohm (1450XM/2050XM)
R312	24366273	CF, 27k ohm (2151XM)
R313	24366183	CF, 18k ohm (1450XM)
R313	24366163	CF, 16k ohm (2050XM)
R313	24366273	CF, 27k ohm (2151XM)
R320	24366473	CF, 47k ohm
R331	24545479	FR, 4.7 ohm, 1/4W
R333	24338109	MF, 1 ohm, 1W (1450XM)
R333	24338229	MF, 2.2 ohm, 1W (2050XM/2151XM)
R336	24383271	OMF, 270 ohm, 2W
R350	24066602	VR, 50k ohm, 1/10W
R365	24366224	CF, 220k ohm
R400	24366475	CF, 4.7M ohm (1450XM)
R400	24366155	CF, 1.5M ohm (2050XM/2151XM)
R401	24366473	CF, 47k ohm
R402	24366622	CF, 6200 ohm
R403	24366682	CF, 6800 ohm
R404	24366123	CF, 12k ohm
R405	24366104	CF, 100k ohm (2151XM only)
R407	24366224	CF, 220k ohm
R409	24366392	CF, 3900 ohm
R410	24366151	CF, 150 ohm
R411	24366391	CF, 390 ohm
R416	24019323	OMF, 1800 ohm, 5W (2050XM)
R416	24019321	OMF, 1500 ohm, 5W (1450XM/2151XM)
R417	24366182	CF, 1800 ohm
R420	24366221	CF, 220 ohm
R430	24366103	CF, 10k ohm
R432	24382181	OMF, 180 ohm, 1W
R433	24366472	CF, 4700 ohm
R442	24532102	FR, 1k ohm, 1W (1450XM/2050XM)
R443	24532102	FR, 1k ohm, 1W (2151XM only)
R445	24339229	MF, 2.2 ohm, 2W (2151XM only)
R447	24382472	OMF, 4700 ohm, 1W
R448	24338278	OMF, 0.27 ohm, 1W
R470	24338758	MF, 0.75 ohm, 1W (1450XM/2050XM)
R470	24338688	MF, 0.68 ohm, 1W (2151XM)
R471	24552301	OMF, 300 ohm, 1/2W
R473	24366153	CF, 15k ohm
R474	24376393	CF, 39k ohm, 1/2W
R479	24552820	OMF, 82 ohm, 1/2W
R501	24366102	CF, 1k ohm
R502	24366102	CF, 1k ohm
R503	24366102	CF, 1k ohm
R504	24366271	CF, 270 ohm
R505	24366271	CF, 270 ohm
R506	24366271	CF, 270 ohm
R507	24366332	CF, 3300 ohm
R509	24366101	CF, 100 ohm
R516	24366101	CF, 100 ohm
R517	24366101	CF, 100 ohm
R520	24366475	CF, 4.7M ohm
R522	24366475	CF, 4.7M ohm
R540	24366103	CF, 10k ohm
R560	24366221	CF, 220 ohm

Location No.	Part No.	Description
R561	24366564	CF, 560k ohm
R603	24366162	CF, 1600 ohm
R604	24366562	CF, 5600 ohm
R605	24366339	CF, 3.3 ohm
R606	24366393	CF, 39k ohm
R612	24366103	CF, 10k ohm
R613	24366103	CF, 10k ohm
R614	24366181	CF, 180 ohm
R663	24552221	OMF, 220 ohm, 1/2W (1450XM/2151XM)
R801	24009954	Metal-Glazed Resistor, 2.2M ohm, 1/2W
R808	24019340	PTC Thermistor, 18 ohm, 290V
R810	24569229	Cement, 2.2 ohm, 10W
R816	24366471	CF, 470 ohm
R817	24366331	CF, 330 ohm
R818	24366561	CF, 560 ohm
R819	24366102	CF, 1k ohm
R830	24546569	FR, 5.6 ohm, 1/2W
R831	24366471	CF, 470 ohm
R840	24531120	FR, 12 ohm, 1/2W
R841	24366752	CF, 7500 ohm
R846	24366332	CF, 3300 ohm
R848	24366470	CF, 47 ohm
R861	24383223	OMF, 22k ohm, 2W
R862	24552220	OMF, 22 ohm, 1/2W
R863	24366432	CF, 4300 ohm
R864	24366561	CF, 560 ohm
R866	24552390	OMF, 39 ohm, 1/2W
R867	24000251	MF, 62k ohm, $\pm 1\%$, 1/4W
R868	24552103	OMF, 10k ohm, 1/2W
R870	24531220	FR, 22 ohm, 1/2W
R871	24310109	MF, 1.0 ohm, 1/2W
R872	24377224	CF, 220k ohm, 1W
R881	24366472	CF, 4700 ohm
R883	24552752	OMF, 7500 ohm, 1/2W
R884	24552752	OMF, 7500 ohm, 1/2W
R891	24366102	CF, 1k ohm
R898	24366222	CF, 2200 ohm
R899	24005007	Metal-Glazed Resistor, 8.2M ohm, 1W
R901	24376472	CF, 4700 ohm, 1/2W
R902	24376472	CF, 4700 ohm, 1/2W
R903	24376472	CF, 4700 ohm, 1/2W
R911	24366101	CF, 100 ohm
R912	24366101	CF, 100 ohm
R913	24366101	CF, 100 ohm
R920	24000568	FR, 4.7 ohm, 1W
R921	24366561	CF, 560 ohm (1450XM)
R921	24366391	CF, 390 ohm (2050XM/2151XM)
R922	24366561	CF, 560 ohm (1450XM)
R922	24366391	CF, 390 ohm (2050XM/2151XM)
R923	24366561	CF, 560 ohm (1450XM)
R923	24366391	CF, 390 ohm (2050XM/2151XM)
R931	24366152	CF, 1500 ohm
R932	24366152	CF, 1500 ohm
R933	24366152	CF, 1500 ohm
R961	24383183	OMF, 18k ohm, 2W
R962	24383183	OMF, 18k ohm, 2W
R963	24383183	OMF, 18k ohm, 2W

Location No.	Part No.	Description
R971	24366681	CF, 680 ohm
R972	24366102	CF, 1k ohm
R973	24366471	CF, 470 ohm
R974	24366271	CF, 270 ohm
R980	24552560	OMF, 56 ohm, 1/2W
RA02	24366102	CF, 1k ohm
RA03	24366102	CF, 1k ohm
RA04	24366102	CF, 1k ohm
RA05	24366102	CF, 1k ohm
RA07	24366102	CF, 1k ohm
RA08	24366102	CF, 1k ohm
RA13	24366102	CF, 1k ohm
RA14	24366103	CF, 10k ohm
RA15	24366103	CF, 10k ohm
RA16	24366102	CF, 1k ohm
RA17	24366102	CF, 1k ohm
RA18	24366102	CF, 1k ohm
RA22	24366472	CF, 4700 ohm
RA23	24366472	CF, 4700 ohm
RA24	24366472	CF, 4700 ohm
RA25	24366332	CF, 3300 ohm
RA26	24366102	CF, 1k ohm
RA27	24366102	CF, 1k ohm
RA28	24366102	CF, 1k ohm
RA33	24366103	CF, 10k ohm
RA35	24366102	CF, 1k ohm
RA36	24366472	CF, 4700 ohm
RA37	24366331	CF, 330 ohm
RA38	24366331	CF, 330 ohm
RA61	24366103	CF, 10k ohm
RA62	24366103	CF, 10k ohm
RA67	24366103	CF, 10k ohm
RA68	24366103	CF, 10k ohm
RA70	24366333	CF, 33k ohm
RA71	24366683	CF, 68k ohm
RA72	24366223	CF, 22k ohm
RA73	24366103	CF, 10k ohm
RB01	24366271	CF, 270 ohm
RB03	24366101	CF, 100 ohm
RB09	24366470	CF, 47 ohm
RB11	24366103	CF, 10k ohm
RB20	24366823	CF, 82k ohm
RB22	24366103	CF, 10k ohm
RB26	24366103	CF, 10k ohm
RB27	24366103	CF, 10k ohm
RB28	24366104	CF, 100k ohm
RB30	24366103	CF, 10k ohm
RB36	24381103	OMF, 10k ohm, 1/2W
RB40	24366103	CF, 10k ohm
RB41	24366182	CF, 1800 ohm
RB42	24366102	CF, 1k ohm
RB43	24366222	CF, 2200 ohm
RB44	24366152	CF, 1500 ohm
RB45	24366221	CF, 220 ohm
RP02	24366105	CF, 1M ohm
RQ03	24366222	CF, 2200 ohm
RQ05	24366473	CF, 47k ohm
RQ08	24366473	CF, 47k ohm
RQ50	24066879	VR, 1k ohm, 0.3W
RQ51	24066876	VR, 10k ohm, 0.3W
RR22	24366471	CF, 470 ohm
RR23	24366471	CF, 470 ohm
RR24	24366471	CF, 470 ohm
RS02	24366681	CF, 680 ohm

Location No.	Part No.	Description
RS03	24366472	CF, 4700 ohm
RS04	24366513	CF, 51k ohm
RS06	24366513	CF, 51k ohm
RS07	24366391	CF, 390 ohm
RS08	24366750	CF, 75 ohm
RS10	24366101	CF, 100 ohm
RS11	24366564	CF, 560k ohm
RV01	24366750	CF, 75 ohm
RV05	24366102	CF, 1k ohm
RV06	24366101	CF, 100 ohm
RV07	24366104	CF, 100k ohm
RV09	24366103	CF, 10k ohm
RV10	24366561	CF, 560 ohm
RV11	24366101	CF, 100 ohm

COILS & TRANSFORMERS

L201	23238714	Coil, Peaking, TRF4100AJ
L301	23103880	Coil (Ferrite Bead), TEM2011Y
L410	23103880	Coil (Ferrite Bead), TEM2011Y
L411	23103880	Coil (Ferrite Bead), TEM2011Y
L430	23238714	Coil, Peaking, TRF4100AJ
L441	23233070	Coil, Linearity, TLN2111 (2050XM)
L441	23233071	Coil, Linearity, TLN2112G (2151XM)
△L462	23231081	Deflection Yoke, TDY-314MB (1450XM)
△L462	23231153	Deflection Yoke, TDY-320MC (2050XM)
△L462	23231054	Deflection Yoke, TDY-621UA (2151XM)
L805	23261959	Coil, Choke, TRF9240
L840	23289100	Coil, Peaking, TRF4100AF
L861	23103880	Coil (Ferrite Bead), TEM2011Y
L862	23103937	Coil (Ferrite Bead), TEM2004
L883	23103775	Coil (Ferrite Bead), TEM2014
L884	23103775	Coil (Ferrite Bead), TEM2014
L885	23248031	Coil, Choke, TLN3274D
L886	23103880	Coil (Ferrite Bead), TEM2011Y
L887	23248087	Coil, Choke, TLN3312D
△L901	23200243	Degaussing Coil, TSB-2349AC (1450XM)
△L901	23200285	Degaussing Coil, TSB-2359AG (2050XM)
△L901	23200217	Degaussing Coil, TSB-2223AC (2151XM)
LA01	23289100	Coil, Peaking, TRF4100AF
LP01	23289470	Coil, Peaking, TRF4470AF
T401	23224983	Transformer, Horiz. Drive, TLN1039
T461	23236480	Transformer, Flyback, TFB4122BD (1450XM/2050XM)
T461	23236466	Transformer, Flyback, TFB4125AD (2151XM)
T801	23211867	Line Filter, TRF3148
T862	23217276	Transformer, Converter, TPW3319AE

SEMICONDUCTORS

Q301	23319459	IC, LA7837
Q203	23114530	Transistor, 2SA933S-Q
Q303	A6002040	Transistor, RN1204
Q402	A6330069	Transistor, 2SC2482 FA-1
Q404	A6871294	Transistor, 2SD1555-Q

Location No.	Part No.	Description
Q421	23319202	IC, MC7809CT
Q430	23314445	Transistor, 2SC4721-Q
Q432	A6002030	Transistor, RN1203
Q470	A6547250	Transistor, 2SA1320
Q501	23904952	IC, M52707SP
Q610	23119668	IC, TDA2611A
Q611	A6342206	Transistor, 2SC2878-A(TE)
Q612	23114530	Transistor, 2SA933S-Q
Q620	A6010040	Transistor, RN2004
Q801	23904956	IC, STR-Z2152,L
Q817	23114528	Transistor, 2SC1740S-Q
Q818	A6012010	Transistor, RN2201
Q819	23114528	Transistor, 2SC1740S-Q
Q830	23314141	Transistor, 2SC3852
Q840	23318299	IC, L78MR05
Q843	A6002050	Transistor, RN1205
Q846	A6360200	Transistor, 2SC3333
Q862	A8643108	Photo Coupler, TLP621(GR-LF)
Q872	23314141	Transistor, 2SC3852
Q883	A6907752	IC, S1854FA-1
Q901	23314457	Transistor, 2SC4722-M
Q902	23314457	Transistor, 2SC4722-M
Q903	23314457	Transistor, 2SC4722-M
Q971	23114530	Transistor, 2SA933S-Q
Q980	A6330059	Transistor, 2SC2482(C)
QA01	23905246	IC, M3722M6-B84SP (See page 36)
QA02	23904665	IC, NM24C04EN (See page 36)
QB01	23114528	Transistor, 2SC1740S-Q
QB03	A6002050	Transistor, RN1205
QB20	A6002010	Transistor, RN1201
QB21	23114528	Transistor, 2SC1740S-Q
QB30	23114528	Transistor, 2SC1740S-Q
QB40	23114528	Transistor, 2SC1740S-Q
QP01	23904954	IC, U3660M-B
QQ01	23905127	IC, M52325P-A
QS01	A6342206	Transistor, 2SC2878-A(TE)
QS02	23114530	Transistor, 2SA933S-Q
QV04	23904943	IC, MM1111XS
QV05	23114528	Transistor, 2SC1740S-Q
QV10	23114528	Transistor, 2SC1740S-Q
D101	23115878	Diode, Zener, μ PC574J, (L)
D201	23118859	Diode, 1SS133
D230	23316672	Diode, Zener, MTZJ5.6B (2151XM only)
D301	23118094	Diode, EU2A
D302	23118094	Diode, EU2A
D303	23316794	Diode, SC570A (2151XM only)
D304	23118859	Diode, 1SS133
D306	23316323	Diode, Zener, UZ9.1BSA
D309	23316326	Diode, Zener, UZ10BSA
D401	23316321	Diode, Zener, UZ8.2BSB
D402	23316333	Diode, Zener, UZ12BSB
D406	23118094	Diode, EU2A
D408	23118094	Diode, EU2A
D430	23115537	Diode, 1SS131
D431	23316326	Diode, Zener, UZ10BSA
D439	23316689	Diode, Zener, MTZJ8.2B
D440	23316254	Diode, ERC06-15 (2151XM only)
D441	23316312	Diode, Zener, UZ6.2BSB
D444	23118338	Diode, RU4AM (2151XM only)
D470	23316333	Diode, Zener, UZ12BSB

Location No.	Part No.	Description
D500	23316323	Diode, Zener, UZ9.1BSA
D612	23118859	Diode, 1SS133
D620	23118859	Diode, 1SS133
D621	23118859	Diode, 1SS133
D622	23118859	Diode, 1SS133
D801	23316391	Diode, D3SB60, 4109
D818	23316337	Diode, UZ13BSC
D830	23316309	Diode, Zener, UZ5.6BSB
D846	23316312	Diode, Zener, UZ6.2BSB
D862	23118094	Diode, EU2A
D864	23118094	Diode, EU2A
D872	23316341	Diode, Zener, UZ16BSB
D875	23316345	Diode, Zener, UZ18BSB
D876	23118859	Diode, 1SS133
D881	23118859	Diode, 1SS133
D883	23316813	Diode, EG1
D884	23316813	Diode, EG1
D885	23118060	Diode, AL01Z
D898	23118859	Diode, 1SS133
D980	23118859	Diode, 1SS133
D981	23316554	Diode, 1SS146
D982	23316554	Diode, 1SS146
D983	23316554	Diode, 1SS146
DA19	23316672	Diode, Zener, MTZJ5.6B
DB01	23358501	Diode (LED), SCL003URC5F
DB30	23118859	Diode, 1SS133
DQ20	23118859	Diode, 1SS133

MISCELLANEOUS

F470	23144876	Fuse, 0.5A (1450XM/2050XM)
F470	23144827	Fuse, 0.63A (2151XM)
F470A	23165433	Holder, Fuse
F801	23144834	Fuse, 3.15A
F801A	23165433	Holder, Fuse
G218	-----	Tinned Wire (1450XM)
G218	24366163	CF, 16k (2050XM)
G218	24366153	CF, 15k (2151XM)
G302	23289100	Coil, Peaking, TRF4100AF
G305	23118859	Diode, 1SS133
G520	23238704	Coil, Peaking, TRF4680AJ
GV04	24366102	CF, 10k
KB01	23904950	Remoto Sensor, SIU-10000
L462B	23199314	Compensator, DY, TC-E (2151XM only)
L462C	23997346	Compensator, DY, TC-N (2151XM only)
P661	23365728	Jack, Earphone (1450XM/2151XM)
P801	23176893	Power Cord
P802	23368020	Plug, 2P
PV01	23365814	Jack, Phono
S801	23344382	Switch, Power
SA01	23145227	Switch, Push, 1C1P
SA02	23145227	Switch, Push, 1C1P
SA03	23145227	Switch, Push, 1C1P
SA04	23145227	Switch, Push, 1C1P
SA05	23145227	Switch, Push, 1C1P
SA06	23145227	Switch, Push, 1C1P
V901A	23902966	Socket, CRT
V901M	23102409	Magnet, P/C, MAG-1070
W661	23351113	Speaker, SPK-1380
X401	23153423	Ceramic Resonator, 503KHz, TCR1073
X501	23153427	Crystal, 3.58MHz

Location No.	Part No.	Description
X502	23153410	Crystal, 4.43MHz
XA01	23153325	Ceramic Resonator, 8.00M, TCR1056
ZP03	23144778	Fuse, 1.0A
ZP04	23144451	Protector, 5.0A, PRF5000
ZP05	23144451	Protector, 5.0A, PRF5000
PC BOARD ASSEMBLIES		
* U101	23704386	Main Board, PB5670-1 (1450XM)
* U101	23704466	Main Board, PB5734-1 (2050XM)
* U101	23704305	Main Board, PB5609-1 (2151XM)
* U102	23704387	CRT Drive Board, PB5670-2 (1450XM)
* U102	23704467	CRT Drive Board, PB5734-2 (2050XM)
* U102	23704306	CRT Drive Board, PB5609-2 (2151XM)
PICTURE TUBE		
△ V901	23312480	Picture Tube, A34JLL90X(W) (1450XM)
△ V901	23312045	Picture Tube, A48JLL90X (2050XM)
△ V901	23312619	Picture Tube, A51JSW99X(G) (2151XM)
TUNER		
H001	23321185	Tuner, EC921X3
ACCESSORIES		
K902	23306115	Remote Control CT-9817
AT03	23305450	Battery Cover, CT-9692
Y101	23562433	Owner's Manual, English/Arabic, 1450XM/2050XM
Y101	23562419	Owner's Manual, English/Arabic, 2151XM
Y108	23122780	AC Adaptor, 2P
Y124	23293988	Adapter, Aerial Matching
Y126	23124971	Antenna, Telescopic (1450XM)
Y126	23124864	Antenna, Telescopic (2151XM)

INFORMATION FOR REPLACEMENT OF QA01 (MICROCOMPUTER IC) AND QA02 (MEMORY IC)

On this model, there exists two different combinations for Microcomputer (QA01) and memory IC (QA02). Confirm which combination is used in the servicing TV set and replace the suitable parts as described below.

1. TWO COMBINATIONS DELIVERED OUT OF FACTORY

Combination (a)

	QA01	QA02
Type Name	M37222M6-B80SP	NM24C04EN
Part No.	23905082	Limited IC

Combination (b)

	QA01	QA02
Type Name	M37222M6-B84SP	NM24C04EN
Part No.	23905246	Regular IC

Note : QA02 looks the same in appearance.

2. CONFIRMATION OF PART NUMBER OF IC (QA01)

Use the SELF DIAGNOSTIC FUNCTION. (See page 23.)

* However, if this function does not operate due to failure, draw out chassis to see TYPE NAME on the IC (QA01) directly.

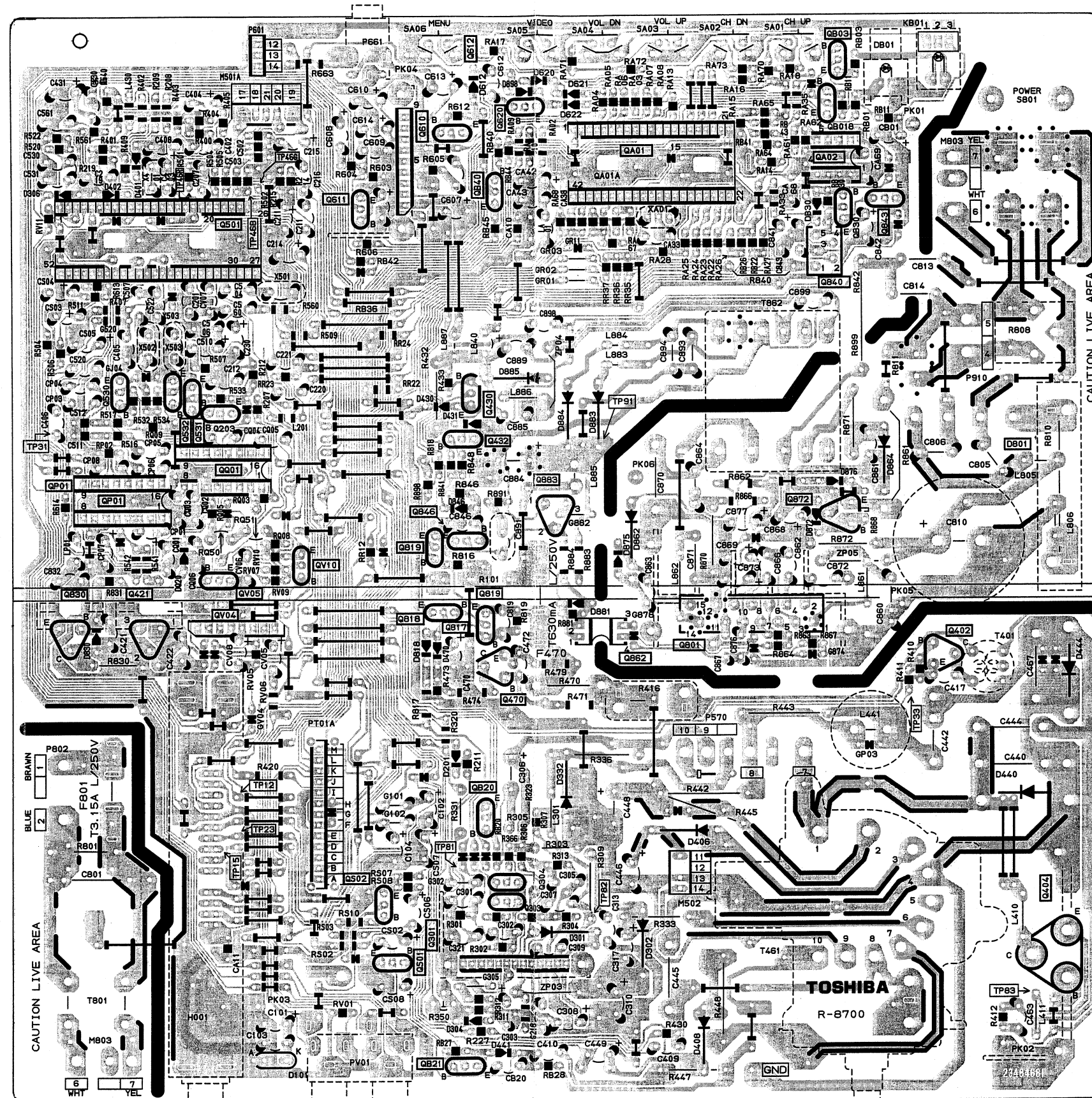
(SELF CHECK)
23905082
POWER : 00
BUS LINE : OK
BUS CONT : OK
SYNC : OK

3. REPLACEMENT

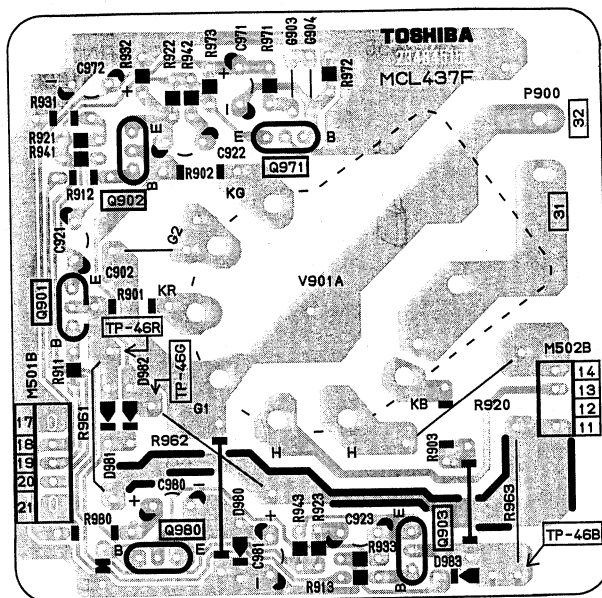
For only the combination (a), keep cautions which are described below.

- (1) When replacing either QA01 or QA02, replace both of them (QA01 and QA02) at the same time.
- (2) Always throw away the old IC's after being replaced. Do not reuse the limited IC of QA02 for preventing mixture.

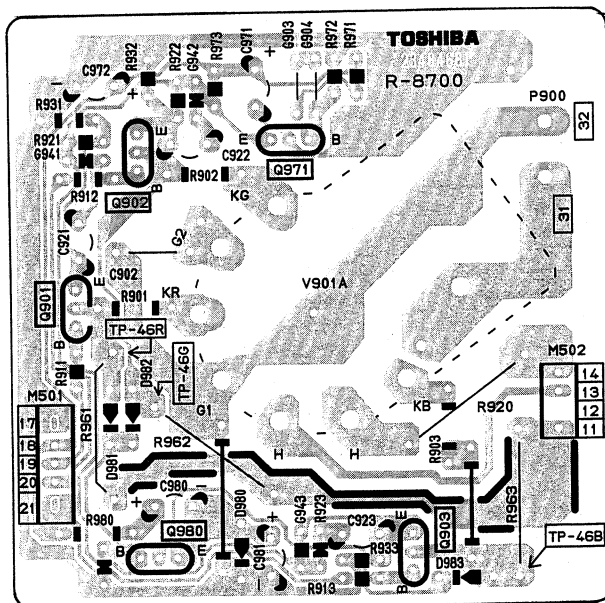
MAIN BOARD PB5609-1 (2151XM)
BOTTOM (FOIL) SIDE



CRT-D BOARD (1450XM, 2050XM) **BOTTOM (FOIL) SIDE**



CRT-D BOARD PB5609-2 (2151XM) **BOTTOM (FOIL) SIDE**



TERMINAL VIEW OF TRANSISTOR, etc.

① 2SA1015
2SC388ATM
2SC1815
2SA562TM
2SC1959
2SC1627
2SC2878
2SC2482
2SA1300
2SC752GTM



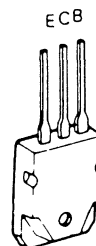
② 2SC2120
2SC2230
2SC2655



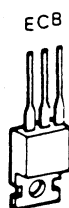
③ RN1203
RN1204
RN1205
RN1206
RN2201



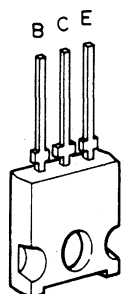
④ 2SA1265N



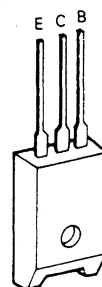
⑤ 2SD553
2SC1569
2SC2383
2SC3148
2SA1012

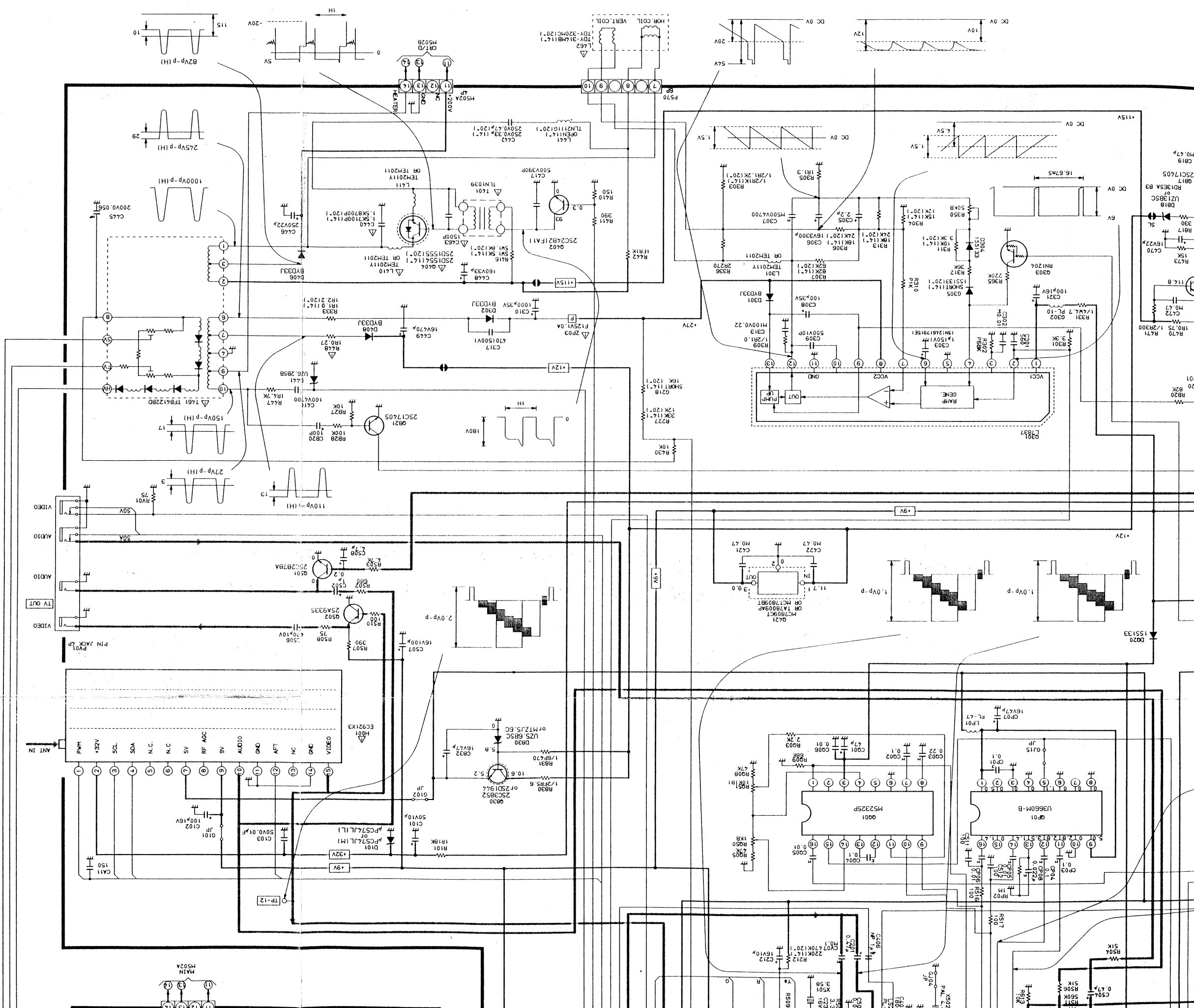


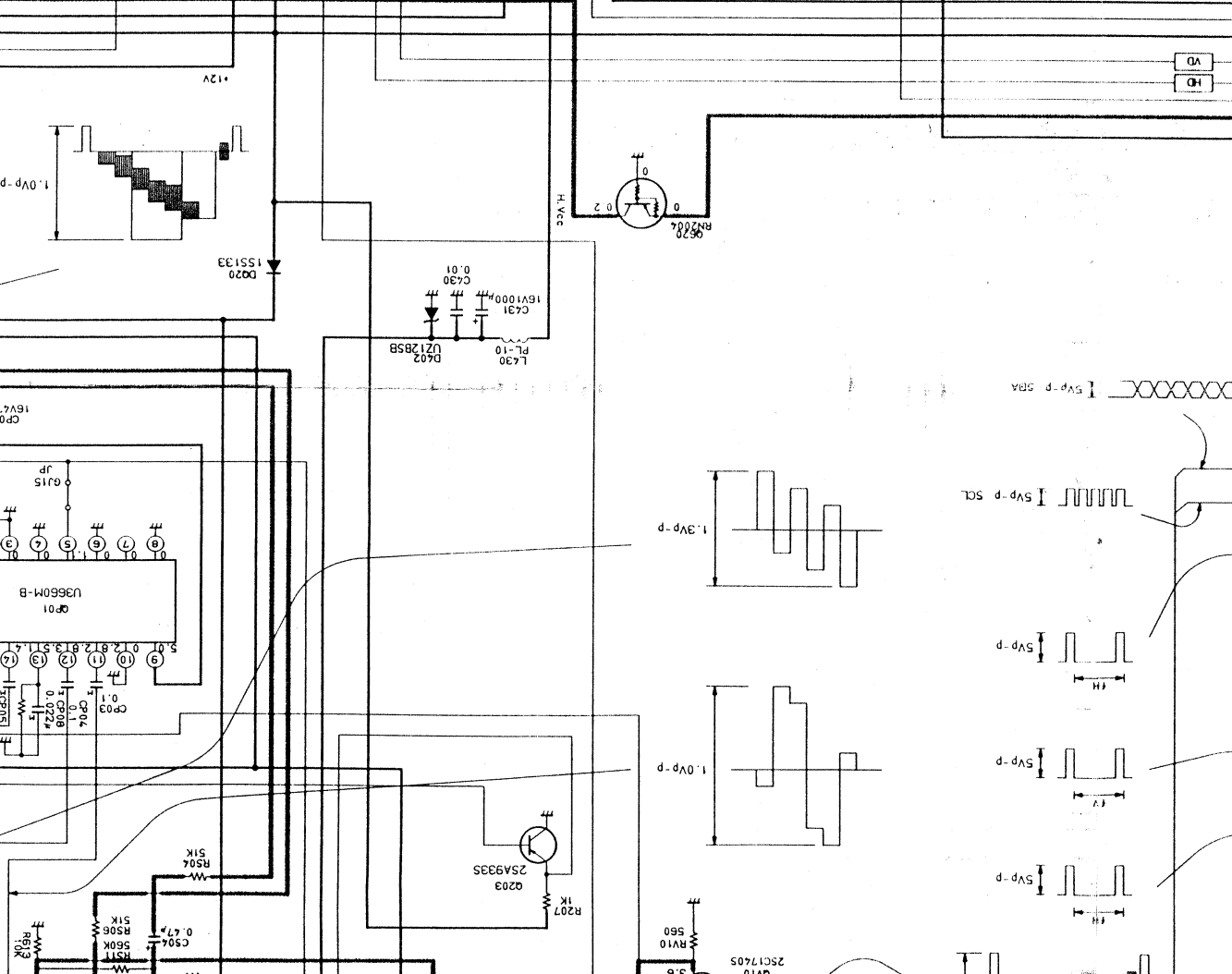
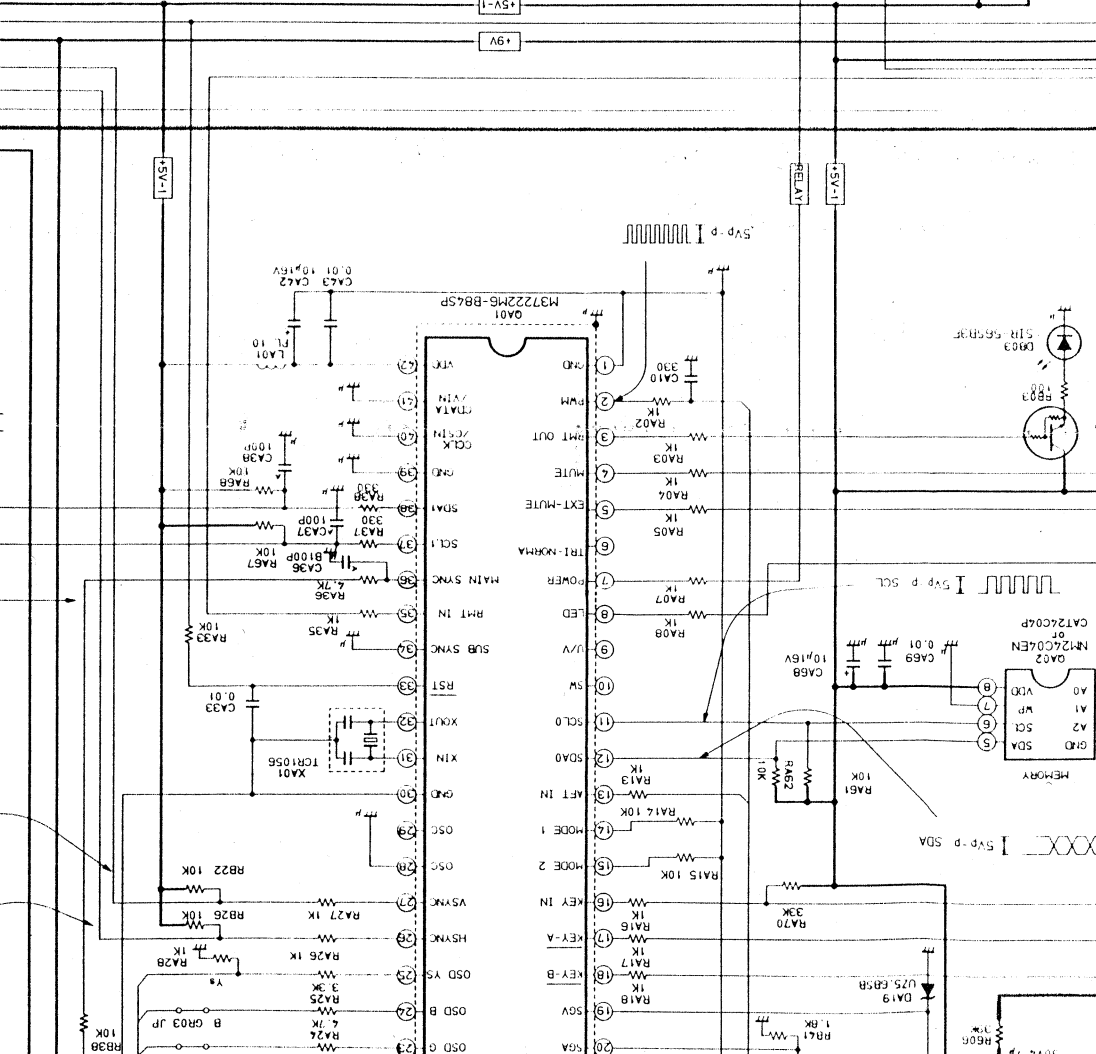
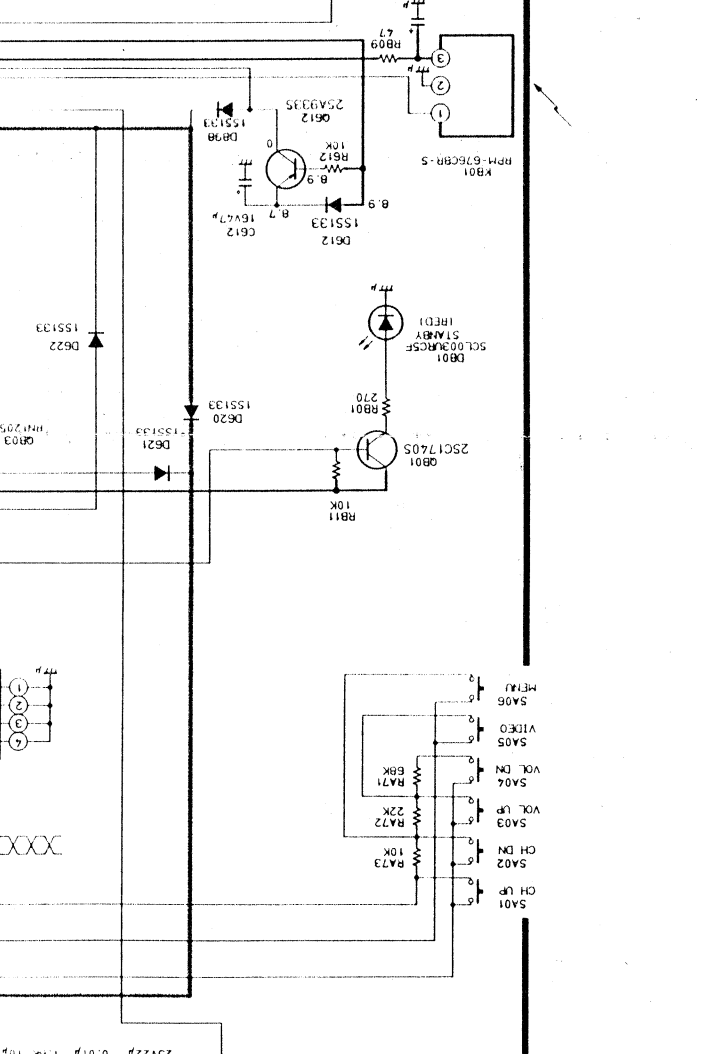
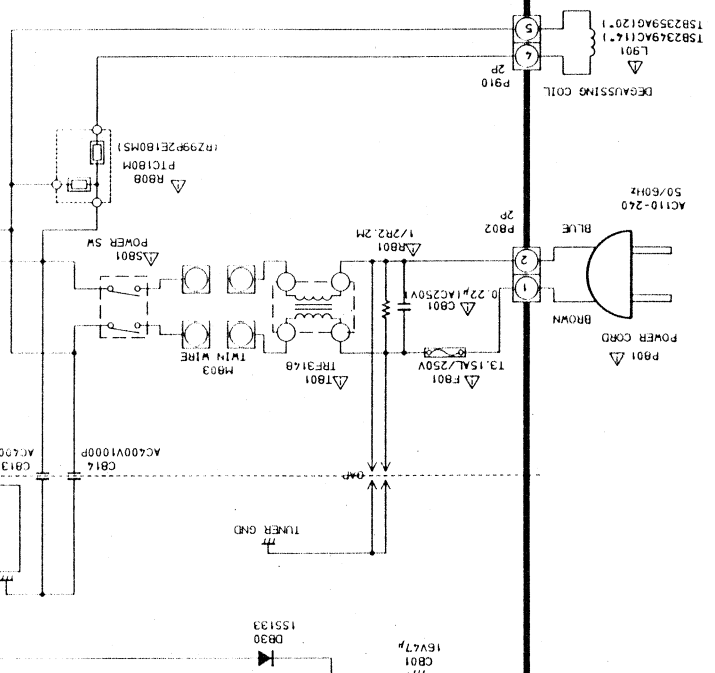
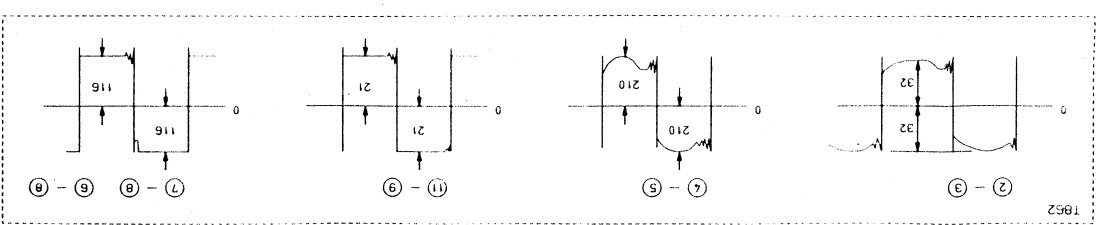
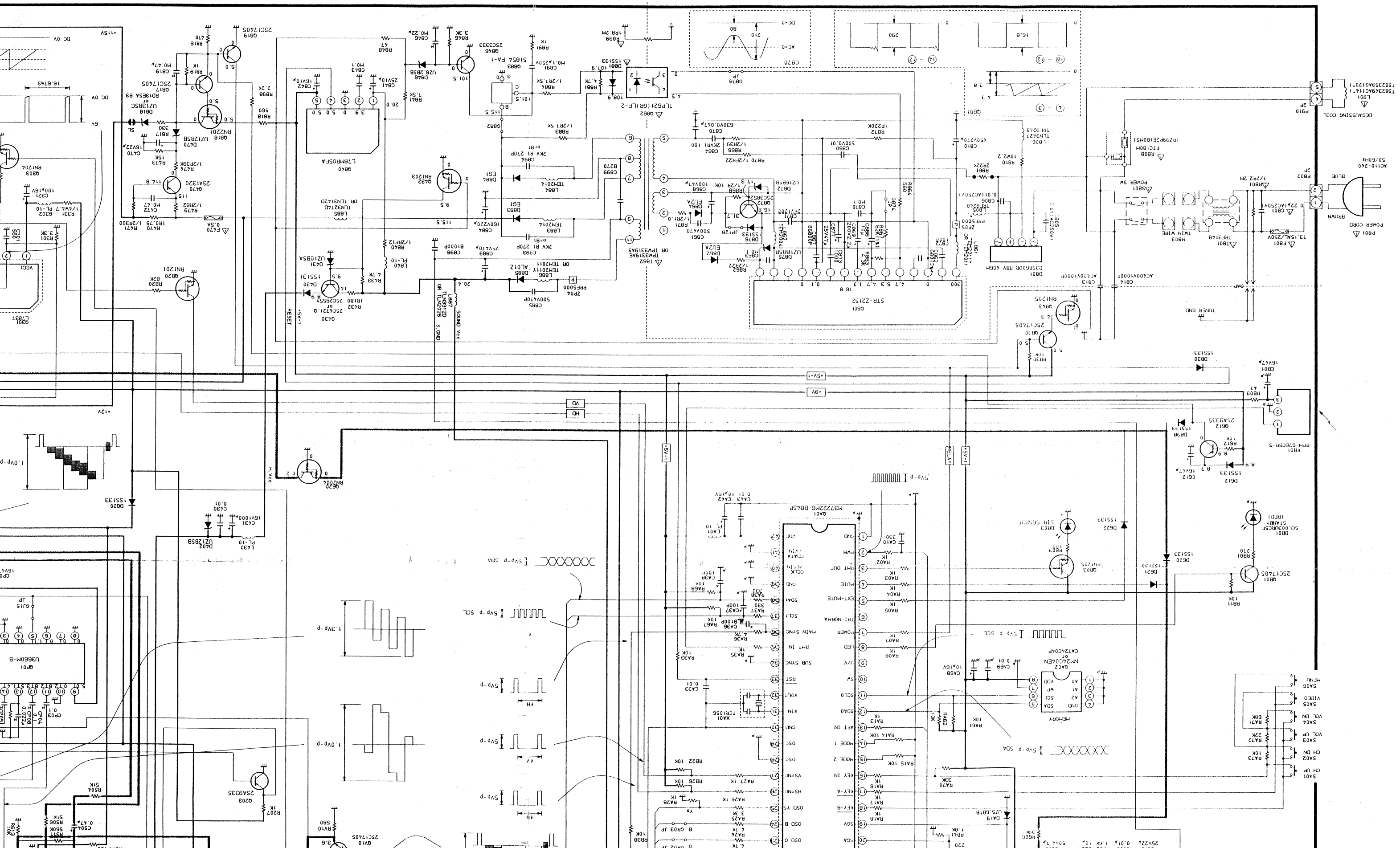
⑥ 2SC3619



⑦ ON4409







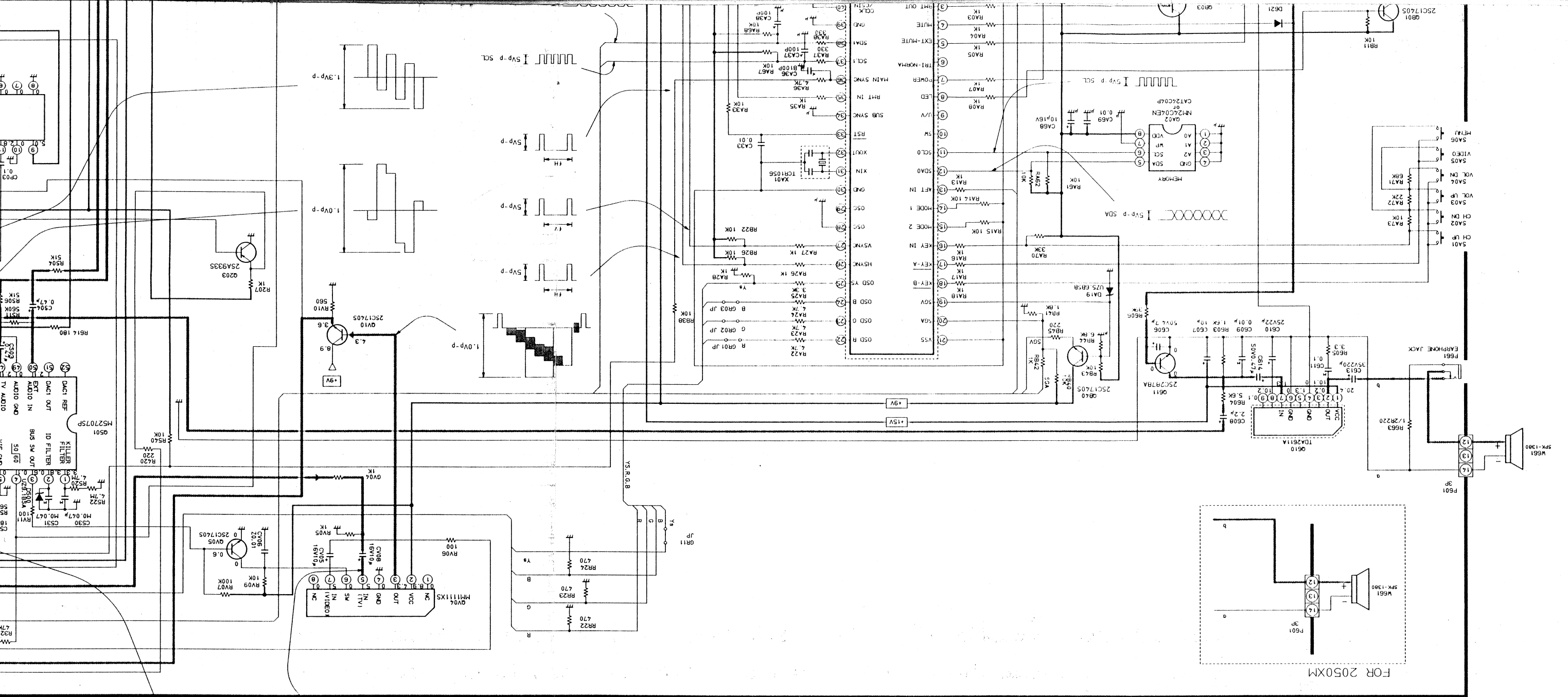
SCHEMATIC DIAGRAM

MODEL: 1450XM : 2050XM

CAUTION: The international hazard symbols "△" in the schematic diagram and the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list. The mounting position of replacements is to be identical with originals. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE on page 2. Do not degrade the safety of the receiver through improper servicing.

- OBSERVATION OF VOLTAGES AND WAVEFORMS**
1. Voltages read with VTVM from point shown to chassis ground, line voltage 220 volt, colour bar signal. Voltages reading may vary $\pm 20\%$.
 2. All waveforms are taken using a wide band oscilloscope and a low capacity probe.
 3. Waveforms are taken using a standard colour bar signal.
 4. Make sure that CONTRAST and COLOUR controls are in mid position and BRIGHTNESS control is almost in maximum position. Set other controls for best picture.

PB5670-1 (1450XM)
U101 MAIN BOARD PB5734-1 (2050XM)



- NOTES:**
1. D.C. resistance value of a primary...
 2. The circuits are subject to chan...
 3. Solder links.

SCHEMATIC DIAGRAM MODEL: 2151XM

CAUTION: The international hazard symbols "△" in the schematic diagram and the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list. The mounting position of replacements is to be identical with originals. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE on page 2. Do not degrade the safety of the receiver through improper servicing.

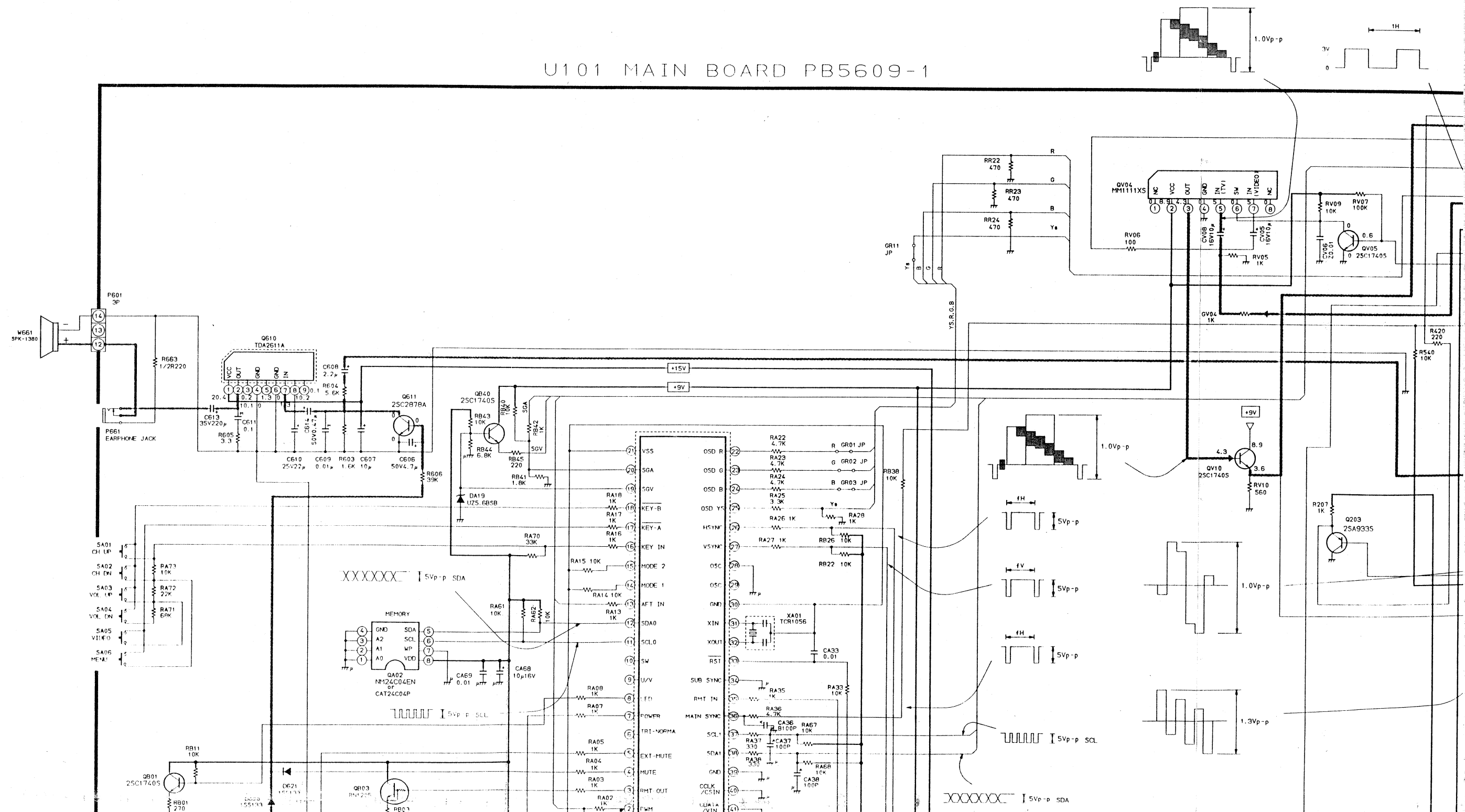
OBSERVATION OF VOLTAGES AND WAVEFORMS

1. Voltages read with VTVM from point shown to chassis ground, line voltage 220 volts, colour bar signal. Voltages reading may vary $\pm 20\%$.
2. All waveforms are taken using a wide band oscilloscope and a low capacity probe.
3. Waveforms are taken using a standard colour bar signal.
4. Make sure that CONTRAST and COLOUR controls are in mid position and BRIGHTNESS control is almost in maximum position. Set other controls for best picture.


NOTES:

1. D.C. resist
2. The circu
3. Sol

U101 MAIN BOARD PB5609-1



NOTES:

1. D.C. resistance value of a principal transformer is shown in this schematic diagram. These are measured for separated from the circuit.
2. The circuits are subject to change without notice.
3.  : Solder links.

EXPRESSION

VALUE OF RESISTOR, CAPACITOR and INDUCTOR

1. Resistance is shown in ohm, k=1,000, M=1,000,000
2. Unless other wise noted in schematic, all capacitor values less than 1 are expressed in μF and the values more than 1 in pF.
3. Unless otherwise noted in schematic, all inductor values more than 1 are expressed in μH , and the values less than 1 in H.

RESISTOR

Table 1













Type	Mark
Carbon Composition	S
Oxide Metal Film	R
Insulated Carbon Film	P
Cement	W
Variable Resistor	
Fusible Resistor	FR

Table 2

Watt	Mark	Watt	Mark
1/6 W		3 W	
1/8 W		5 W	
1/4 W		10 W	
1/2 W		15 W	
1 W		20 W	
2 W		25 W	